



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 16, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **005**  
Proposed Specification: **0050104 Control of Work.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Scott Arnold from the State Construction Office to clarify shop drawing submittal and review requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTROL OF THE WORK (REV 2-12-21)

SUBARTICLE 5-1.4 is deleted and the following is substituted:

### 5-1.4 Shop Drawings:

**5-1.4.1. Definitions:** In addition to the definitions below, also refer to Section 1, Definitions and Terms.

1. Bracing: Temporary structural member(s) placed between beams, girders, piles, precast -columns, etc. to provide stability during construction activities.

2. Construction Affecting Public Safety: Construction that may jeopardize public safety such as structures and construction operations spanning over or adjacent to functioning vehicular roadways, demolition of a continuous span structure while traffic is under any span, pedestrian walkways, railroads, navigation channels of navigable waterways and walls supporting fill sections or excavations or other structure foundations located in embankments immediately adjacent to functioning roadways. Construction Affecting Public Safety may also apply to the construction or demolition of a bridge with continuous beams or girders if traffic is being placed under one of the spans within the unit. It does not apply to those areas of the site under the Contractor's control and outside the limits of normal public access. Adjacent as used above applies to any project or property where normal construction operations could impact functioning vehicular roadways, pedestrian walkways, railroads, and navigable waterways.

3. Contractor Originated Designs: Items which the Contract Documents require the Contractor to design, detail and incorporate into the permanent works.

4. Detailer: The steel detailer that prepares the steel shop drawings for the fabrication, geometry and fit-up for all steel members in accordance with the Plans.

75. Falsework: Any temporary construction work used to support the permanent structure until it becomes self-supporting. Falsework includes steel or timber beams, girders, columns, bracing, piles and foundations, and any proprietary equipment including modular shoring frames, post shores, and adjustable horizontal shoring.

68. Formwork: Any structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Formwork may be comprised of common materials such as wood or metal sheets, battens, soldiers and walers, ties, proprietary forming systems such as stay-in-place metal forms, and proprietary supporting bolts, hangers and brackets. Formwork may be either permanent formwork requiring a shop drawing submittal such as stay-in-place metal or concrete forms, or may be temporary formwork which requires certification by the Specialty Engineer for Construction Affecting Public Safety and for Major and Unusual Structures.

75. Major and Unusual Structures: Bridges of complex geometry and/or complex design. Generally, this includes the following types of structures:

- a. Bridges with an individual span longer than 300 feet.
- b. Structurally continuous superstructures with spans over 150 feet.
- c. Steel box and plate girder bridges.
- d. Concrete or steel straddle piers and straddle pier caps.
- e. Steel truss bridges including pedestrian steel truss spans that utilize proprietary designs.

f. Concrete segmental, post-tensioned girder bridges and post-tensioned substructures.

g. Cable stayed, extradosed or suspension bridges.

h. Arch bridges.

i. Tunnels.

j. All movable bridges (including specifically structural, electrical and mechanical components).

k. Rehabilitation, widening, lengthening or jacking of any of the above structures.

28. Permanent Works: All the permanent structures and parts thereof required of the completed Contract.

9. QA/QC Shop Drawing Check Prints: The Engineer of Record is responsible for conducting a review of all shop drawings regardless of whether the shop drawing is originated by the Engineer of Record or by others.- QA/QC sShop dDrawing eCheck pPrints shall consist of highlighting items that the EOR is able to verify based on the EOR's plans and design information on each sheet reviewed.- Each sheet shall be initialed by the reviewer. QA/QC Shop Drawing Check Prints shall be submitted to the Department along with the stamped Shop Drawing.

109. Scaffolding: An elevated work platform used to support workers, materials and equipment, but not intended to support the structure.

11. Shop Drawings: A shop drawing is a drawing or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator for prefabricated components. Shop drawings also include all working drawings, erection plans, associated trade literature, material cut-sheets, calculations, schedules, erection manuals, geometry control manuals and other manuals and similar documents submitted by the Contractor to define some portion of the project work. The type of work includes both permanent and temporary works as appropriate to the project.

~~Shop Drawings: All working, shop and erection drawings, associated trade literature, calculations, schedules, manuals and similar documents submitted by the Contractor to define some portion of the project work. The type of work includes both permanent and temporary works as appropriate to the project.~~

120. Shoring: is a component of falsework such as horizontal, vertical or inclined support members. In this Section, this term is interchangeable with falsework.

613. Special Erection Equipment: Includes launching gantries, beam and winch equipment, form travelers, segment lifters, beam shifters, stability towers, strong-backs, erection trusses, launching noses or similar items made purposely for construction of the structure. It does not apply to commonly available proprietary construction equipment such as cranes.

143. Temporary Works: Any temporary construction work necessary for the construction of the permanent works. This includes but is not limited to bracing, falsework, formwork, scaffolding, shoring, stability towers, strong-backs, counterweights, temporary earthworks, sheeting, cofferdams, and special erection equipment.

5-1.4.2 Shop Drawing Submittal and Review Requirements: See table below for shop drawing submittal and review requirements.

Table 005-1  
Submittal and Review Requirements

<u>Shop Drawing for:</u>	<u>Originated by Specialty Engineer Not Signed and Sealed</u>	<u>Originated by Detailer Not Signed and Sealed</u>	<u>Originated by Specialty Engineer Signed and Sealed</u>	<u>Originated by Contractor's EOR Signed and Sealed</u>	<u>Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR</u>
<u>Steel Fabrication Drawings</u>		<u>Originator</u>			<u>Reviewer</u>
<u>Steel Erection Plan</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Geometry Control Manual</u>				<u>Originator</u>	<u>Reviewer</u>
<u>Segmental Erection Manual</u>				<u>Originator</u>	<u>Reviewer</u>
<u>Segmental Shop Drawings</u>	<u>Originator</u>				<u>Reviewer</u>
<u>Post-tensioning Mock-up Plan</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Post-tensioning Systems<sub>1</sub></u>			<u>Originator</u>		<u>Reviewer</u>
<u>Pretensioned Prestressed Concrete Products Containing FRP Bars or Strands Excluding Standard Piles and Sheet Piles</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Temporary Works Affecting Public Safety<sub>2</sub></u>			<u>Originator</u>		<u>Reviewer</u>

<u>Table 005-1</u> <u>Submittal and Review Requirements</u>					
<u>Shop Drawing for:</u>	<u>Originated by Specialty Engineer Not Signed and Sealed</u>	<u>Originated by Detailer Not Signed and Sealed</u>	<u>Originated by Specialty Engineer Signed and Sealed</u>	<u>Originated by Contractor's EOR Signed and Sealed</u>	<u>Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR</u>
<u>Demolition Plans of Bridges with Continuous Beams or Girders Where One Span Within the Unit is Over Traffic</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Prefabricated Bridge Elements and System Connection Mock-Up Plans</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Bridge Formwork Including SIP Forms</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Construction Equipment Placed on Existing Bridges</u>				<u>Originator</u>	<u>Reviewer</u>
<u>Bridge components not fully detailed in the Plans, i.e. post-tensioning details, handrails, temporary operating systems for movable bridges etc.</u>				<u>Originator</u>	<u>Reviewer</u>
<u>Retaining Wall Systems</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Precast Box Culverts</u>			<u>Originator</u>		<u>Reviewer</u>

<u>Table 005-1</u> <u>Submittal and Review Requirements</u>					
<u>Shop Drawing for:</u>	<u>Originated by Specialty Engineer Not Signed and Sealed</u>	<u>Originated by Detailer Not Signed and Sealed</u>	<u>Originated by Specialty Engineer Signed and Sealed</u>	<u>Originated by Contractor's EOR Signed and Sealed</u>	<u>Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR</u>
<u>Non-standard structures and components for drainage, lighting, signalization and signing</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Building structures</u>			<u>Originator<sub>3</sub></u>		<u>Reviewer<sub>4</sub></u>
<u>Non-standard crash cushions and other nonstructural items</u>			<u>Originator</u>		<u>Reviewer</u>
<u>Design and structural details furnished by the Contractor in compliance with the Contract</u>				<u>Originator</u>	<u>Reviewer</u>
<u>Material or Product Cut-Sheets</u>	<u>Originator</u>				<u>Reviewer</u>
<p><u>1 Includes approved post-tensioning systems and project specific integration details of the approved system.</u></p> <p><u>2 Does not include formwork complying with Standard Plans, Index 102-600 (concrete placement is not permitted directly over traffic). Also, does not include critical temporary walls that are fully detailed in the plans unless redesigned by the Contractor. Does not include specialized equipment if traffic is removed from under equipment while equipment is being loaded, launched, and while loads are being transported by equipment.</u></p> <p><u>3 In lieu of a Specialty Engineer, originator may be a licensed Architect.</u></p> <p><u>4 In lieu of the Design Engineer of Record, the reviewer may be the Design Architect of Record.</u></p>					

**5-1.4.2 Work Items Requiring Shop Drawings:** In general, the Department requires shop drawings for items of work not fully detailed in the Plans which require additional drawings and coordination prior to constructing the item, including but not limited to:

1. Bridge components not fully detailed in the Plans, i.e. segments, steel girder details, post-tensioning details, handrails, etc.
2. Retaining Wall Systems
3. Precast Box Culverts
4. Non-standard structures and components for drainage, lighting, signalization and signing

~~5. Building structures~~  
~~6. Non-standard crash cushions and other nonstructural items~~  
~~7. Design and structural details furnished by the Contractor in compliance with the Contract~~  
~~8. Temporary Works affecting public safety~~  
~~Additional clarification for certain types of bridge structures is provided in 5-1.4.7. Other provisions of the Contract Documents may waive the requirement for submittals for certain items; i.e., items constructed from standard drawings or those complying with alternate details for prestressed members under Section 450. Review the Contract Documents to determine the submittals required.~~

**5-1.4.3 Schedule of Submittals:** Prepare and submit a schedule of submittals that identifies the work for which shop drawings apply. For each planned submittal, define the type, and approximate number of drawings or other documents that are included and the planned submittal date, considering the processing requirements herein. Submit the schedule of submittals to the Department's Shop Drawing Review Office and the Engineer of Record within 60 days of the start of the Contract, and prior to the submission of any shop drawings.

Coordinate subsequent submittals with construction schedules to allow sufficient time for review, ~~re-submittal~~ resubmittal and approval prior to beginning fabrication, approval, and re-submittal as necessary.

#### **5-1.4.4 Style, Numbering, and Material of Submittals:**

**5-1.4.4.1 Drawings:** Submit all shop drawings that are necessary to complete the structure in compliance with the design shown in the Plans. Prepare all shop drawings using the same units of measure as those used in the Contract Plans. Consecutively number each sheet in the submittal series, and indicate the total number in the series (i.e., 1 of 12, 2 of 12 . . . 12 of 12). Include on each sheet the following items as a minimum requirement: the complete Financial Project Identification Number, Bridge Number(s), drawing title and number, a title block showing the names of the fabricator or producer and the Contractor for which the work is being done, the initials of the person(s) responsible for the drawing, the date on which the drawing was prepared, the location of the item(s) within the project, the Contractor's approval stamp with date and initials, and, when applicable, the documents shall be signed and sealed by the Specialty Engineer or Contractor's Engineer of Record, ~~as appropriate~~. A re-submittal will be requested when any of the required information is not included.

Shop drawings shall be submitted in Portable Document Format (PDF) files, formatted on ~~sheets 11-inch~~ by 17 inches ~~sheets~~.

**5-1.4.4.2 Other Documents:** Submit PDF files of other documents such as trade literature, catalogue information, calculations, ~~work plans including methods, phasing, procedures, sequences~~ and manuals formatted on sheets no larger than 11 ~~inch~~ by 17 inches. Clearly label and number each sheet in the submittal to indicate the total number of sheets in the series (i.e., 1 of 12, 2 of 12 . . . 12 of 12).

Prepare all documents using the same units of measure as the Contract Plans and include a Table of Contents cover sheet. List on the cover sheet the total number of pages and appendices, and include the complete Financial Project Identification Number, a title referencing the submittal item(s), the name of the firm and person(s) responsible for the preparation of the document, the Contractor's approval stamp with date and initials, and, when applicable, the documents shall be signed and sealed by the Specialty Engineer or Contractor's Engineer of Record, ~~as appropriate~~.

Submit appropriately prepared and checked calculations and manuals that clearly outline the design criteria. Include on the internal sheets the complete Financial Project Identification Number and the initials of the person(s) responsible for preparing and checking the document.

Clearly label trade literature and catalogue information on the front cover with the title, Financial Project Identification Number, date and name of the firm and person(s) responsible for that document.

#### **5-1.4.5 Submittal Paths:**

**5-1.4.5.1 General:** Shop drawings are not required ~~for prequalified items~~for items on the Approved Products List used as intended in the relevant Standard Plans and Standard Specifications. For non-prequalified items, determine the submittal path to be followed based upon the identity of the Engineer of Record as shown adjacent to the title block on the structural plan sheets, and on the key sheets of roadway plans, signing, and pavement marking plans, and/or lighting plans. At the preconstruction conference, the Department will notify the Contractor in writing of any changes in the submittal path and whether the Department's or the Consultant's review stamp will signify an officially reviewed shop drawing.

1. When the Florida Department of Transportation is the Engineer of Record, submit shop drawings to the Resident Engineer and to the appropriate Department ~~Shop Drawing~~ Review Office. Include in the submittal other information such as catalog data, procedure manuals, fabrication/welding procedures, and maintenance and operating procedures when required by the work. Submit material certifications and material tests to the Resident Engineer.

2. When the Engineer of Record is a consultant hired by the Department, submit shop drawings to the consultant, the Resident Engineer and, when requested, to the appropriate Department ~~Shop Drawing~~ Review Office. Include in the submittal other documentation such as catalog data, procedure manuals, fabrication/welding procedures, and maintenance and operating manuals when required by the work. Submit material certifications and material tests to the Resident Engineer.

**5-1.4.5.2 Building Structures:** Submit ~~workingshop drawings, shop and erection drawings,~~ and all correspondence related to building structures, such as Rest Area Pavilions, Office Buildings, and Maintenance Warehouses, to the Architect of Record and the Resident Engineer for review and approval.

**5-1.4.5.3 Contractor-Originated Design:** Submit shop drawings and applicable calculations to the Engineer of Record for review. The shop drawings and applicable calculations must be signed and sealed by the Specialty Engineer or the Contractor's Engineer of Record. Submit in accordance with the requirements of ~~5-1.4.1 5-1.4.5.1 through 5-1.4.3 5-1.4.5.3,~~ as appropriate.

**5-1.4.5.4 Temporary Works:** For Construction Affecting Public Safety, submit to the Engineer of Record shop drawings and the applicable calculations for the design of special erection equipment, bracing, falsework, scaffolding, etc. The shop drawings and applicable calculations must be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of ~~5-1.4.1 5-1.4.5.1 through 5-1.4.3 5-1.4.5.3,~~ as appropriate.

**5-1.4.5.5 Demolition Plans of Bridges with Continuous Beams or Girders when Traffic is Under Any of the Spans of the Unit During Demolition Activities:** For demolition plans of bridges with continuous beams or girders when traffic is placed under any of the spans of the unit during demolition activities, the Specialty Engineer shall prepare



signed and sealed demolition plans and applicable calculations including a step-by-step sequence of demolition, etc. Clearly denote any traffic restrictions for all demolition steps. Submit in accordance with the requirements of 5-1.4. 1 through 5-1.4. 3, as appropriate.

**5-1.4.5.65 Falsework Founded on Shallow Foundations:** When vertical displacement limits are provided in the Plans for falsework founded on shallow foundations such as spread footings and mats, submit to the Engineer of Record shop drawings and applicable calculations of the falsework system including subsurface conditions and settlement estimates. The shop drawings and applicable calculations must be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of ~~5-1.4.15-1.4.5.1~~ through 5-1.4.35.3, as appropriate.

**5-1.4.5.76 Formwork and Scaffolding:** The Contractor is solely responsible for the safe installation and use of all formwork and scaffolding. The Department does not require any formwork or scaffolding submittals unless such work would be classified as Construction Affecting Public Safety. For formwork, scaffolding, or other temporary works affecting public safety; develop the required designs in accordance with the AASHTO Guide Design Specifications for Bridge Temporary Works, the AASHTO Construction Handbook for Bridge Temporary Works, and Chapter 11 of the Structures Design Guidelines (SDG) using wind loads specified in the SDG.

**5-1.4.5.87 Beam, ~~and Girder~~ and Column Temporary Bracing:** The Contractor is solely responsible for ensuring stability of beams, ~~and~~ girders ~~and~~ columns during all handling, storage, shipping and erection. Adequately brace beams ~~and~~, girders ~~and~~ columns to resist wind, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the products, considering actual beam geometry and support conditions during all stages of erection and deck construction. At a minimum, provide temporary bracing at each end of each beam or girder. Develop the required bracing designs in accordance with the AASHTO LRFD Bridge Design Specifications (LRFD) and Chapter 11 of the SDG using wind loads specified in the SDG. For information not included in the SDG or LRFD, refer to the AASHTO Guide Design Specifications for Bridge Temporary Works and the AASHTO Construction Handbook for Bridge Temporary Works.

For Construction Affecting Public Safety, when temporary bracing requirements are shown in the Plans, submit plans and calculations signed and sealed by a Specialty Engineer for the design of temporary bracing members and connections based on the forces shown in the Plans. In addition, submit a written certification that construction loads do not exceed the assumed loads shown in the Plans.

For Construction Affecting Public Safety, when temporary bracing requirements are not shown in the Plans or an alternate temporary bracing system is proposed, submit plans and calculations signed and sealed by a Specialty Engineer including the stability analysis and design of temporary bracing members and connections.

**5-1.4.5.98 Erection Plan, Geometry Control Manual and Erection Manual:** Submit, for the Engineer's review, an Erection Plan that meets the specific requirements of Sections 450, 452 and 460 and this section. Submit in writing for the Engineer's review, an Erection Manual and Geometry Control Manual that meets the specific requirements of Section 462 and this Section. For all Erection Plans and Erection Manuals refer to Standard Plans, Index 102-600 for construction activities not permitted over traffic. For construction activities not covered in Index 102-600, clearly denote what additional construction steps are not allowed over traffic.

#### 5-1.4.5.109 Other Miscellaneous Design and Structural Details

Furnished by the Contractor in Compliance with the Contract: ~~The Submit to the~~ Engineer of Record shall review all shop drawings and the applicable calculations for miscellaneous design and structural details as required by the Contract. The shop drawings and applicable calculations must will be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of ~~5-1.4.15-1.4.5.1~~ through ~~5-1.4.35-1.4.5.3~~, as appropriate.

#### 5-1.4.6 Processing of Shop Drawings:

**5-1.4.6.1 Contractor Responsibility for Accuracy and Coordination of Shop Drawings:** Coordinate, schedule, and control all submittals, with a regard for the required priority, including those of the various subcontractors, suppliers, and engineers, to provide for an orderly and balanced distribution of the work.

Coordinate, review, date, stamp, approve and sign all shop drawings prepared by the Contractor or agents (subcontractor, fabricator, supplier, etc.) prior to submitting them to the Engineer of Record for review. Submittal of the drawings confirms verification of the work requirements, units of measurement, field measurements, construction criteria, sequence of assembly and erection, access and clearances, catalog numbers, and other similar data. Indicate on each series of drawings the specification section and sheet or drawing number of the Contract Plans to which the submission applies. Indicate on the shop drawings all deviations from the Contract drawings and itemize all deviations in the letter of transmittal. Likewise, whenever a submittal does not deviate from the Contract Plans, clearly state so in the submittal.

Schedule the submission of shop drawings to allow for a 45 calendar day review period for all submittals associated with a category 2 bridge; tolling components identified in the current FDOT General Tolling Requirements (GTR) Part 3; and the tolling-related signing, DMS and ITS infrastructure. Schedule the submission of shop drawings to allow for a 25 calendar day review period for all other items. The review period commences upon the Engineer's of Record's receipt of the valid submittal or valid re-submittal and terminates upon the transmittal of the submittal back to the Contractor. A valid submittal includes all the minimum requirements outlined in 5-1.4.4.

Submit shop drawings to facilitate expeditious review. The Contractor is discouraged from transmitting voluminous submittals of shop drawings at one time. For submittals transmitted in this manner, allow for the additional review time that may result.

Only shop drawings distributed with the approval stamps are valid and all work that the Contractor performs in advance of approval will be at the Contractor's risk. Work affecting Public Safety may not be performed prior to approval of appropriate submittals and work may not proceed at the Contractor's risk.

**5-1.4.6.2 Scope of Review by Engineer of Record:** The Engineer of Record's review of the shop drawings is for conformity to the requirements of the Contract Documents and to the intent of the design. The Engineer of Record's review of shop drawings which include means, methods, techniques, sequences, and construction procedures are limited to the effects on the permanent works. The Engineer of Record's review of submittals which include means, methods, techniques, sequences, and construction procedures does not include an in-depth check for the ability to perform the work in a safe or efficient manner. ~~Review by the Engineer of Record does not relieve the Contractor of responsibility for dimensional accuracy to ensure field fit and for conformity of the various components and details.~~

### 5-1.4.6.3 Special Review by Engineer of Shop Drawings for

**Construction Affecting Public Safety:** ~~For Construction Affecting Public Safety, the Engineer of Record, or other Engineer as the Department appoints for this purpose may request copies of, shop drawings related to Construction Affecting Public Safety for review and comment. will make an independent review of all relevant shop drawings and similar documents. When shop drawings are requested, do~~ Do not proceed with construction of the permanent works until receiving the Engineer of Record's written approval. ~~The review of these shop drawings is for overall structural adequacy of the item to support the imposed loads and does not include a check for economy, efficiency or ease of construction.~~

### 5-1.4.7 Other Requirements for Shop Drawings for Bridges:

#### 5-1.4.7.1 Shop Drawings for Structural Steel and Miscellaneous

**Metals:** Submit shop drawings for structural steel and miscellaneous metals. Shop drawings shall consist of ~~working~~, shop, and erection drawings, welding procedures, and other working plans, showing details, dimensions, sizes of material, and other information necessary for the complete fabrication and erection of the metal work.

**5-1.4.7.2 Shop Drawings for Concrete Structures:** Submit shop drawings for concrete components that are not cast-in-place and are not otherwise exempted from submittal requirements. Also, submit shop drawings for all details that are required for the effective ~~prosecution~~ execution of the concrete work and are not included in the Contract Documents such as: special erection equipment, masonry layout diagrams, and diagrams for bending reinforcing steel, in addition to any details required for concrete components for the permanent work.

**5-1.4.7.3 Shop Drawings for Major and Unusual Structures:** In addition to any other requirements, within 60 days from the Notice to Proceed, submit information to the Engineer outlining the integration of the Major and Unusual Structure into the overall approach to the project. Where applicable to the project, include, but do not limit this information to:

1. The overall construction program for the duration of the Contract. Clearly show the Milestone dates. (For example, the need to open a structure by a certain time for traffic operations.)
2. The overall construction sequence. The order in which individual structures are to be built, the sequence in which individual spans of girders or cantilevers are erected, and the sequence in which spans are to be made continuous, and the order that components are to be installed (such as mechanical and electrical devices in moveable bridges).
3. The general location of any physical obstacles to construction that might impose restraints or otherwise affect the construction, and an outline of how to deal with such obstacles while building the structure(s). (For example, obstacles might include road, rail and waterway clearances, temporary diversions, transmission lines, utilities, property, and the Contractor's own temporary works, such as haul roads, cofferdams, plant clearances and the like.)
4. The approximate location of any special lifting equipment in relation to the structure, including clearances required for the operation of the equipment. (For example, crane positions, operating radii and the like.)

5. The approximate location of any temporary falsework, and the conceptual outline of any special erection equipment. Provide the precise locations and details of attachments, fixing devices, loads, etc. in later detailed submittals.

6. An outline of the handling, transportation, and storage of fabricated components, such as girders or concrete segments. Provide the precise details in later detailed submittals.

7. Any other information pertinent to the proposed scheme or intended approach.

Clearly and concisely present the above information on as few drawings as possible in order to provide an overall, integrated summary of the intended approach to the project. The Department will use these drawings for information, review planning, and to assess the Contractor's approach in relation to the intent of the original design. Submittal to and receipt by the Engineer does not constitute any Department acceptance or approval of the proposals shown thereon. Include the details of such proposals on subsequent detailed shop drawing submittals. Submit timely revisions and re-submittals for all variations from these overall scheme proposals.

**5-1.4.8 Modifications for Construction:** Where the Engineer allows the Contractor to make modifications to the permanent works for the purposes of expediting the Contractor's chosen construction methods, the Contractor shall submit proposals to the Engineer of Record for review and approval prior to modifying the works. Submit proposals for minor modifications under the shop drawing process. Indicate on all drawings the deviations from the Contract Documents and itemize all deviations in the letter of transmittal. The Department will require additional submittals and/or submittal under a Cost Savings Initiative Proposal for major modifications.

Minor modifications are those items that, in the opinion of the Engineer, do not significantly affect the quantity of measured work, or the integrity or maintainability of the structure or its components. (For example, adjusting concrete dimensions, substituting steel plate sizes, changing reinforcing bar size and spacing, etc., all within the acceptable limits of the design.)

Major modifications are any modifications that, in the opinion of the Engineer, significantly affect the quantity of measured work, or the integrity or maintainability of the structure or its' components. (For example, substituting alternative beam sizes and spacings, changing material strength or type, and the like.). Submit signed and sealed revised sheets to the Engineer for any such revisions to the Contract Plans prior to submitting shop drawings.

The Engineer's decision on the delineation between a minor and a major modification and the disposition of a proposal is final.

**5-1.4.9 Cost of Shop Drawings:** Include the cost of shop ~~and working~~ drawings submittal in the Contract prices for the work requiring the shop ~~and working~~ drawings. The Department will not pay the Contractor additional compensation for such drawings.



*Florida Department of Transportation*

RON DESANTIS  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

February 16, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **005**  
Proposed Specification: **0050104DB Control of Work.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Scott Arnold from the State Construction Office to clarify shop drawing submittal and review requirements for Design Build projects.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTROL OF THE WORK (REV 2-12-21)

SUBARTICLE 5-1.4 is deleted and the following is substituted:

### 5-1.4 Shop Drawings:

**5-1.4.1. Definitions:** In addition to the definitions below, also refer to Section 1, Definitions and Terms.

1. ~~1.~~ Bracing: Temporary structural member(s) placed between beams, girders, piles, precast columns, etc. to provide stability during construction activities.

2. ~~2.~~ Construction Affecting Public Safety: Construction that may jeopardize public safety such as structures and construction operations spanning over or adjacent to functioning vehicular roadways, pedestrian walkways, railroads, navigable waterways, and walls supporting fill sections or excavations immediately adjacent to function roadways ~~demolition of a continuous span structure while traffic is under any span, pedestrian walkways, railroads, navigation channels of navigable waterways and walls or other structure foundations located in embankments immediately adjacent to functioning roadways.~~ Construction Affecting Public Safety may also apply to the demolition of a bridge with continuous beams or girders if traffic is being placed under one of the spans within the unit. It does not apply to those areas of the site ~~under the Contractor's control and~~ outside the limits of normal public access. Adjacent as used above applies to any project or property where normal construction operations could impact functioning vehicular roadways, pedestrian walkways, railroads, or navigable waterways

3. ~~23.~~ Contractor Originated Designs: Items which the Contract Documents require the Contractor to design, detail and incorporate into the permanent works.

4. ~~4.~~ Detailer: The steel detailer that prepares the steel shop drawings for fabrication, geometry and fit-up for all steel members in accordance with the Plans.

5. ~~7.~~ Falsework: Any temporary construction work used to support the permanent structure until it becomes self-supporting. Falsework includes steel or timber beams, girders, columns, bracing piles and foundations, and any proprietary equipment including modular shoring frames, post shores, and adjustable horizontal shoring.

6. ~~86.~~ Formwork: Any structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Formwork may be comprised of common materials such as wood or metal sheets, battens, soldiers and walers, ties, proprietary forming systems such as stay-in-place metal forms, and proprietary supporting bolts, hangers and brackets. Formwork may be either permanent formwork requiring a shop drawing submittal such as stay-in-place metal or concrete forms; or may be temporary formwork which requires certification by the Specialty Engineer for Construction Affecting Public Safety and for Major and Unusual Structures.

7. ~~7.~~ Construction IPR of Temporary Works Affecting Public Safety: Construction Independent Peer Reviews (IPRs) are required to validate the design of all Temporary Works Affecting Public Safety and bridge demolition plans affecting public safety. Except as defined below, the Construction IPR may be performed by a Specialty Engineer not responsible for the initial work.- In no case shall the Construction IPR Reviewer and the Specialty Engineer responsible for the initial work be employed by the same Firm. The Construction IPR is intended to be a comprehensive, thorough independent verification of the

original work. The Construction IPR is not simply a check of the Specialty Engineer's plans and calculations; it is an independent verification of the design using different programs and independent processes than what was used by the Specialty Engineer responsible for the initial work. The Engineer of Record is permitted to perform the Construction IPR provided that the above conditions are met. All Shop Drawings requiring an IPR shall be submitted to the Department with a Signed and Sealed Construction IPR Certification Letter stating "...that the design of the temporary works has been reviewed and is in full compliance with all Contract Documents and appropriate design codes." The Construction IPR letter must also state which components (e.g. temporary works, etc.) were reviewed.

For temporary works meeting the requirements herein supporting the construction of Major and Unusual Structures defined in 5-1.4.8.a, 5-1.4.8.f and 5-1.4.8.g, the Construction IPR shall be performed by a qualified engineer per Rule 14-75 consistent with the relevant bridge type. Also, the certification shall be expanded to include a statement that "a verification of the temporary works includes a verification of all loads, reactions and displacements accounting for the interaction with the structure being supported and based on the design erection tolerances, force effects due to applicable superimposed deformations (uniform temperature, temperature gradients, elastic shortening, creep, shrinkage), wind and construction loads through all phases of construction."

85. Major and Unusual Structures: Bridges of complex ~~geometry and/or complex~~ design. Generally, this includes the following types of structures:

- a. Bridges with an individual span longer than 300 feet.
- b. Structurally continuous superstructures with spans over 150 feet.
- c. Steel box and plate girder bridges.
- d. Concrete or steel straddle piers and straddle pier caps.

ed. Steel truss bridges including pedestrian steel truss spans that utilize proprietary designs.

fe. Concrete segmental ~~and longitudinally~~ post-tensioned ~~continuous~~ girder bridges and post-tensioned substructures.

- f. Cable stayed, extradosed or suspension bridges.
- g. Arch bridges.
- h. Tunnels.
- i. All Movable bridges (specifically including structural. electrical and mechanical components).
- jk. Rehabilitation, widening, ~~or~~ lengthening or jacking of any of the above.

92. Permanent Works: All the permanent structures and parts thereof required of the completed Contract.

10. QA/QC Shop Drawing Check Prints: The Engineer of Record is responsible for conducting a review of all shop drawings regardless of whether the shop drawing is originated by the Engineer of Record or by others. QA/QC ~~s~~Shop ~~d~~Drawing ~~e~~Check ~~p~~Prints shall consist of highlighting items that the EOR is able to verify based on the EOR's plans and design information on each sheet reviewed. Each sheet shall be initialed by the reviewer. QA/QC Shop Drawing Check Prints shall be submitted to the Department along with the stamped Shop Drawing.

119. Scaffolding: An elevated work platform used to support workers, materials and equipment, but not intended to support the structure.

12. Shop Drawing: A drawing or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator for prefabricated components. Shop drawings also include all working drawings, erection plans, associated trade literature, material cut-sheets, calculations, schedules, erection manuals, geometry control manuals and other manuals and similar documents submitted by the Contractor to define some portion of the project work. The type of work includes both permanent and temporary works as appropriate to the project.  
~~All working, shop and erection drawings, associated trade literature, calculations, schedules, manuals and similar documents submitted by the Contractor to define some portion of the project work. The type of work includes both permanent and temporary works as appropriate to the project.~~

130. Shoring: A component of falsework such as horizontal, vertical or inclined support members. In this Section, this term is interchangeable with falsework.

146. Special Erection Equipment: Includes launching gantries, beam and winch equipment, form travelers, segment lifters, beam shifters,~~stability towers, strong-backs,~~ erection trusses, launching noses or similar items made purposely for construction of the structure. It does not apply to commonly available proprietary construction equipment such as cranes.

315. Temporary Works: Any temporary construction work necessary for the construction of the permanent works. This includes but is not limited to bracing, falsework, formwork, scaffolding, shoring, stability towers, strong-backs, counterweights, temporary earthworks, sheeting, cofferdams, and special erection equipment.

**5-1.4.2 Shop Drawing Submittal and Review Requirements:** See table 5-1 below for shop drawing submittal and review requirements.

<u>Table 005-1</u> <u>Submittal and Review Requirements</u>						
<u>Shop Drawing for:</u>	<u>Originated by Specialty Engineer Not Signed and Sealed</u>	<u>Originated by Detailer Not Signed and Sealed</u>	<u>Originated by Specialty Engineer Signed and Sealed</u>	<u>Originated by Contractor s EOR Signed and Sealed</u>	<u>Requires Review, QA/QC Check prints and disposition stamp by Design EOR</u>	<u>Requires Construction IPR and signed and sealed Certification Letter</u>
<u>Steel Fabrication Drawings</u>		<u>Originator</u>			<u>Reviewer</u>	
<u>Steel Erection Plan</u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Geometry Control Manual</u>				<u>Originator</u>	<u>Reviewer</u>	



<u>Table 005-1</u> <u>Submittal and Review Requirements</u>						
<u>Segmental Erection Manual</u>				<u>Originator</u>	<u>Reviewer</u>	<u>Reviewer<sub>5</sub></u>
<u>Segmental Shop Drawings</u>	<u>Originator</u>		<u>Originator</u>		<u>Reviewer</u>	
<u>Post- tensioning Mock-up Plan</u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Post- tensioning Systems<sub>1</sub></u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Pretensioned Prestressed Concrete Products Containing FRP Bars or Strands Excluding Standard Piles and Sheet Piles</u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Temporary Works Affecting Public Safety<sub>2</sub></u>			<u>Originator</u>		<u>Reviewer</u>	<u>Reviewer<sub>6</sub></u>
<u>Demolition Plans of Bridges with Continuous Beams or Girders Where One Span Within the Unit is Over Traffic</u>			<u>Originator</u>			<u>Reviewer<sub>7</sub></u>
<u>Prefabricated Bridge Elements and System Connection Mock-Up Plans</u>			<u>Originator</u>		<u>Reviewer</u>	

<u>Table 005-1</u> <u>Submittal and Review Requirements</u>						
<u>Bridge Formwork Including SIP Forms</u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Construction Equipment Placed on Existing Bridges</u>				<u>Originator</u>	<u>Reviewer</u>	
<u>Bridge components not fully detailed in the Plans, i.e. post-tensioning details, handrails, temporary operating systems for movable bridges etc.</u>				<u>Originator</u>	<u>Reviewer</u>	
<u>Retaining Wall Systems</u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Precast Box Culverts</u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Non-standard structures and components for drainage, lighting, signalization and signing</u>			<u>Originator</u>		<u>Reviewer</u>	
<u>Building structures</u>			<u>Originator</u> <sub>3</sub>		<u>Reviewer</u> <sub>4</sub>	
<u>Non-standard crash cushions and other nonstructural items</u>			<u>Originator</u>		<u>Reviewer</u>	

<u>Table 005-1</u> <u>Submittal and Review Requirements</u>					
<u>Design and structural details furnished by the Contractor in compliance with the Contract</u>				<u>Originator</u>	<u>Reviewer</u>
<u>Material or Product Cut-Sheets</u>	<u>Originator</u>				<u>Reviewer</u>
<p><u>1 Includes approved post-tensioning systems and project specific integration details of the approved system.</u></p> <p><u>2 Does not include formwork complying with Standard Plans, Index 102-600 (concrete placement is not permitted directly over traffic). Also, does not include critical temporary walls that are fully detailed in the plans unless redesigned by the Contractor. Does not include specialized equipment if traffic is removed from under equipment while equipment is being loaded, launched, and while loads are being transported by equipment.</u></p> <p><u>3 In lieu of a Specialty Engineer the originator may be a licensed Architect.</u></p> <p><u>4 In lieu of the Design Engineer of Record the reviewer may be the Design Architect of Record.</u></p> <p><u>5. Submit an Independent Peer Review Certification Letter for portions of the Erection Manual that include temporary works affecting public safety. Specifically reference pages in the Erection Manual that are included in the Certification provided. The certification letter shall state: "...that the design of the temporary works has been reviewed and is in full compliance with all Contract Documents and appropriate design codes." The certification letter shall also clearly state what components (e.g. temporary works, etc. were reviewed).</u></p> <p><u>6. The certification letter for the Construction IPR shall state: "...that the design of the temporary works has been reviewed and is in full compliance with all Contract Documents and appropriate design codes." The certification letter shall also clearly state what components (e.g. temporary works, etc. were reviewed).</u></p> <p><u>7. The certification letter for the Construction IPR shall state: "...that the demolition plan has been reviewed and is in full compliance with the Contract and acceptable design codes and specifications."</u></p>					

**5-1.4.2 Work Items Requiring Shop Drawings:** In general, the Department requires shop drawings for items of work not fully detailed in the Plans which require additional drawings and coordination prior to constructing the item, including but not limited to:

- \_\_\_\_\_ 1. Bridge components not fully detailed in the Plans, i.e. segments, steel girder details, post tensioning details, handrails, etc.
- \_\_\_\_\_ 2. Retaining wall systems
- \_\_\_\_\_ 3. Precast Box Culverts
- \_\_\_\_\_ 4. Non-standard structures and components for drainage, lighting, signalization and signing
- \_\_\_\_\_ 5. Building structures
- \_\_\_\_\_ 6. Non-standard crash cushions and other nonstructural items
- \_\_\_\_\_ 7. Design and structural details furnished by the Contractor in compliance with the Contract
- \_\_\_\_\_ 8. Temporary Works affecting public safety

Additional clarification for certain types of bridge structures is provided in 5-1.4.7. Other provisions of the Contract Documents may waive the requirement for submittals for certain items; i.e., items constructed from standard drawings or those complying with alternate details for prestressed members under Section 450. Review the Contract Documents to determine the submittals required.

**5-1.4.3 Schedule of Submittals:** Prepare and submit a schedule of submittals that identifies the work for which shop drawings apply. For each planned submittal, define the type, and approximate number of drawings or other documents that are included and the planned submittal date, considering the processing requirements herein. Submit the schedule of submittals to the Department's Shop Drawing Review Office and the Engineer of Record within 60 days of the start of the Contract construction operations, and prior to the submission of any shop drawings.

Coordinate subsequent submittals with construction schedules to allow sufficient time for review and re-submittal, and approval prior to beginning fabrication, as necessary.

**5-1.4.4 Style, Numbering, and Material of Submittals:**

**5-1.4.4.1 Drawings:** Submit all shop drawings that are necessary to complete the structure in compliance with the design shown on the Plans. Prepare all shop drawings using the same units of measure as those in the Contract Plans. English Units. Consecutively number each sheet in the submittal series, and indicate the total number in the series (i.e., 1 of 12, 2 of 12, . . . , 12 of 12). Include on each sheet the following items as a minimum requirement: the complete Financial Project Identification Number, Bridge Number(s), drawing title and number, a title block showing the names of the fabricator or producer and the Contractor for which the work is being done, the initials of the person(s) responsible for the drawing, the date on which the drawing was prepared, the location of the item(s) within the project, the Contractor's approval stamp with date and initials, and, when applicable, the signature and embossed seal of the documents shall be signed and sealed by the Specialty Engineer or Contractor's Engineer of Record. A re-submittal will be requested when any of the required information is not included.

Shop drawings shall be submitted in Portable Document Format (PDF) files, formatted in on sheets 11 inch-by 17 inches sheets.

**5-1.4.4.2 Other Documents:** Submit PDF files of other documents (such as trade literature, catalogue information, calculations, work plans including methods, phasing, procedures, sequences and manuals formatted on sheets). Provide sheets no larger than 11 by 17 inches. Clearly label and number each sheet in the submittal to indicate the total number of sheets in the series (i.e., 1 of 12, 2 of 12, . . . 12 of 12).

Prepare all documents using English units the same units of measure as the Contract Plans and include a Table of Contents cover sheet. List on the cover sheet the total number of pages and appendices, and include the complete Financial Project Identification Number, a title referencing the submittal item(s), the name of the firm and person(s) responsible for the preparation of the document, the Contractor's approval stamp with date and initials, and, when applicable, the signature and embossed seal of the the documents shall be signed and sealed by the Specialty Engineer or Contractor's Engineer of Record.

Submit appropriately prepared and checked calculations and manuals that clearly outline the design criteria. Include on the internal sheets the complete Financial Project Identification Number and the initials of the person(s) responsible for preparing and checking the document.

Clearly label trade literature and catalogue information on the front cover with the title, Financial Project Identification Number, date and name of the firm and person(s) responsible for that document.

#### 5-1.4.5 Submittal Paths:

##### 5-1.4.5.1 General: Shop drawings are not required for prequalified items.

At the preconstruction conference, the Department will notify the Contractor in writing of any changes in the submittal path and whether the Department's review stamp will signify an officially reviewed shop drawing.

Submit shop drawings to the Engineer. Shop drawings shall be in conformance with the Department's Plans Preparation FDOT Design Manual. When submitted to the Engineer for review by the Department, the shop drawings must bear the stamp and signature of the Contractor, EOR, and signature and seal of the Specialty Engineer, as appropriate. Only forward shop drawings stamped "Approved" or "Approved as Noted" along with the QA/QC Shop Drawing Check Prints and Construction IPR certification letter (when applicable) to the Engineer for review by the Department. Shop drawings submitted without the stamps of the Contractor and the EOR or without the QA/QC Shop Drawing Check Prints or Construction IPR certification letter (when applicable) will be returned for re-submittal. In the case where the EOR generates the shop drawings for the project, another engineer with the EOR's firm, not involved in the production of the shop drawing, will review and stamp the drawings per the requirements stated herein. Shop drawings shall not be submitted, processed reviewed, or approved until the component plan set for the particular item is stamped "Released for Construction". For work requiring other information (e.g., catalog data, procedure manuals, fabrication/welding procedures, and maintenance and operating procedures), submit the required number of copies to the Engineer. Submit material certifications and material tests to the Engineer.

**5-1.4.5.2 Building Structures:** Submit working shop, shop and erection drawings, and all correspondence related to building structures, such as Rest Area Pavilions, Office Buildings, and Maintenance Warehouses, to the Engineer for review by the Department. All shop drawings for building structures shall bear the stamp and signature of the Contractor, Design-Build Firm's Architect of Record, and Specialty Engineer, as appropriate. Only forward shop drawings stamped "Approved" or "Approved as Noted" to the Engineer for Review.

5-1.4.5.3 Contractor Originated Design: Submit shop drawings and applicable calculations to the Engineer of Record for review. The shop drawings and applicable calculations must be signed and sealed by the Specialty Engineer or the Contractor's Engineer of Record. Submit in accordance with the requirements of 5-1.4. 1 through 5-1.4. 3, as appropriate.

**5-1.4.5.4 Temporary Works:** For Construction Affecting Public Safety, the submit to the Engineer of Record and the Construction IPR Reviewer shall review all shop shop drawings and the applicable calculations for the design of special erection equipment, bracing, falsework, scaffolding, etc. The shop drawings and the applicable calculations will be signed and sealed by the Specialty Engineer. Submit the submittal and copies of the transmittal letters in accordance with the requirements of 5-1.4.1 5-1.4.5.1 through 5-1.4.3 5-1.4.5.2, as appropriate. Provide Signed and Sealed Construction IPR Certification Letter with submittal.

**5-1.4.5.5 Demolition Plans of Bridges with Continuous Beams or Girders When Traffic is Under Any of the Spans of the Unit During Demolition Activities:** For demolition plans of bridges with continuous beams or girders when traffic is placed under any of the spans of the unit during demolition activities, the Speciality Engineer shall prepare signed and sealed demolition plans and applicable calculations including a step-by-step sequence

of demolition, etc. Clearly denote any traffic restrictions for all demolition steps. Submit in accordance with the requirements of 5-1.4. 1 through 5-1.4. 3, as appropriate

For bridge demolition meeting the requirements herein the demolition plan shall be Independent Peer Reviewed. The Construction IPR shall be performed by a qualified engineer per Rule 14-75 consistent with the bridge type being demolished. The demolition plan and calculations shall be submitted to the Department with a Signed and Sealed Construction IPR Certification Letter stating "...that the demolition plan has been reviewed and is in full compliance with the Contract and acceptable design codes and specifications."

**5-1.4.5.46 Falsework Founded on Shallow Foundations:** When vertical displacement limits are provided in the Plans for falsework founded on shallow foundations such as spread footings and mats, the Engineer of Record shall review all shop drawings and applicable calculations of the falsework system including subsurface conditions and settlement estimates. The shop drawings and the applicable calculations ~~will~~**must** be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of 5-1.4.1 ~~5-1.4.5.1~~ through ~~5-1.4.3~~5-1.4.5.2, as appropriate.

**5-1.4.5.57 Formwork and Scaffolding:** The Contractor is solely responsible for the safe installation and use of all formwork and scaffolding. The Department does not require any formwork or scaffolding submittals unless such work would be classified as Construction Affecting Public Safety. For formwork, scaffolding, or other temporary works affecting public safety, develop the required designs in accordance with the AASHTO Guide Design Specifications for Bridge Temporary Works, the AASHTO Construction Handbook for Bridge Temporary Works, and Chapter 11 of the Structures Design Guidelines (SDG) using wind loads specified in the SDG.

**5-1.4.5.86 Beam and Girder Temporary Bracing:** The Contractor is solely responsible for ensuring stability of beams, ~~and~~ girders and columns during all handling, storage, shipping and erection. Adequately brace columns, beams and girders to resist wind, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the products, considering actual beam geometry and support conditions during all stages of erection and deck construction. At a minimum, provide temporary bracing at each end of each beam or girder. Develop the required bracing designs in accordance with the AASHTO LRFD Bridge Design Specifications (LRFD) and Chapter 11 of the SDG using wind loads specified in the SDG. For information not included in the SDG or LRFD, refer to the AASHTO Guide Design Specifications for Bridge Temporary Works and the AASHTO Construction Handbook for Bridge Temporary Works.

For Construction Affecting Public Safety, when temporary bracing requirements are shown in the Plans, submit Plans and calculations signed and sealed by a Specialty Engineer for the design of temporary bracing members and connections based on the forces shown in the Plans. In addition, submit a written certification that construction loads do not exceed the assumed loads shown in the Plans.

For Construction Affecting Public Safety, when temporary bracing requirements are not shown in the Plans or an alternate temporary bracing system is proposed, submit Plans and calculations signed and sealed by a Specialty Engineer including the stability analysis and design of temporary bracing members and connections.

**5-1.4.5.97 Erection Plan, Geometry Control Manual and Erection Manual:** Submit, for the Engineer's review, an Erection Plan that meets the specific requirements of Sections 450, 452 and 460 and this section. Submit in writing for the Engineer's

review an Erection Manual and Geometry Control Manual that meets the specific requirements of Section 462 and this Section. Submit an Independent Peer Review Certification Letter for portions of the Erection Manual that include temporary works affecting public safety. Specifically reference pages in the Erection Manual that are included in the Certification provided. For all Erection Plans and Erection Manuals refer to Standard Plans, Index 102-600 for construction activities not permitted over traffic. For construction operations not covered in Index 102-600 clearly denote what additional construction steps are not allowed over traffic.

#### **5-1.4.5.108 Other Miscellaneous Design and Structural Details**

**Furnished by the Contractor in Compliance with the Contract:** The Engineer of Record shall review all shop drawings and the applicable calculations for miscellaneous design and structural details as required by the Contract. The shop drawings and the applicable calculations will be signed and sealed by the Specialty Engineer. Submit in accordance with the requirements of 5-1.4.15-1.4.5.1 through 5-1.4.35-1.4.5.2, as appropriate.

#### **5-1.4.6 Processing of Shop Drawings:**

**5-1.4.6.1 Contractor Responsibility for Accuracy and Coordination of Shop Drawings:** Coordinate, schedule, and control all submittals, with a regard for the required priority, including those of the various subcontractors, suppliers, and engineers, to provide for an orderly and balanced distribution of the work.

Coordinate, review, date, stamp, approve and sign all shop drawings prepared by the Contractor or agents (subcontractor, fabricator, supplier, etc.) prior to submitting them to the Engineer for review. Submittal of the drawings confirms verification of the work requirements, units of measurement, field measurements, construction criteria, sequence of assembly and erection, access and clearances, catalog numbers, and other similar data. Indicate on each series of drawings the specification section and sheet or drawing number of the Contract Plans to which the submission applies. Indicate on the shop drawings all deviations from the Contract drawings and itemize all deviations in the letter of transmittal. Likewise, whenever a submittal does not deviate from the Contract Plans, clearly state so in the submittal.

Schedule the submission of shop drawings to allow for a review period as described in the RFP. The review period commences upon the Engineer's receipt of the valid submittal or valid re-submittal and terminates upon the transmittal of the submittal back to the Contractor. A valid submittal includes all the minimum requirements outlined in 5-1.4.4.

Submit shop drawings to facilitate expeditious review. The Contractor is discouraged from transmitting voluminous submittals of shop drawings at one time. For submittals transmitted in this manner, allow for the additional review time that may result.

Only shop drawings distributed with the approval stamps are valid and all work that the Contractor performs in advance of approval will be at the Contractor's risk. Work affecting Public Safety may not be performed prior to approval of appropriate submittals and work may not proceed at the Contractor's risk.

**5-1.4.6.2 Scope of Review by Engineer of Record:** The Engineer of Record's review of the shop drawings is for conformity to the requirements of the Contract Documents and to the intent of the design. The Engineer of Record's review of shop drawings which include means, methods, techniques, sequences, and construction procedures are limited to the effects on the permanent works. The Engineer of Record's review of submittals which

include means, methods, techniques, sequences, and construction procedures does not include an in-depth check for the ability to perform the work in a safe or efficient manner.

~~5-1.4.6.3 Special Review by the Engineer of Shop Drawings by the Engineer of Record for Construction Affecting Public Safety: The Engineer may request copies of shop drawings related to Constretion Affecting Public Safety for review and comment. When shop drawings are requested, do not proceed with construction of the permanent works until receiving the Engineer's written approval. For Construction Affecting Public Safety, the Engineer of Record will perform an independent review of all relevant shop drawings and similar documents. Do not proceed with construction of the permanent works until receiving the Engineer of Record's written approval.~~

#### **5-1.4.7 Other Requirements for Shop Drawings for Bridges:**

##### **5-1.4.7.1 Shop Drawings for Structural Steel and Miscellaneous**

**Metals:** Submit shop drawings for structural steel and miscellaneous metals. Shop drawings shall consist of ~~working~~, shop, and erection drawings, welding procedures, and other working ~~Plans~~ plans, showing details, dimensions, sizes of material, and other information necessary for the complete fabrication and erection of the metal work.

**5-1.4.7.2 Shop Drawings for Concrete Structures:** Submit shop drawings for concrete components that are not cast-in-place and are not otherwise exempted from submittal requirements. Also, submit shop drawings for all details that are required for the effective ~~prosecution~~ execution of the concrete work and are not included in the Contract Documents such as: special erection equipment, masonry layout diagrams, and diagrams for bending reinforcing steel, in addition to any details required for concrete components for the permanent work.

**5-1.4.7.3 Shop Drawings for Major and Unusual Structures:** In addition to any other requirements, within 60 days from the ~~n~~Notice to ~~P~~roceed, submit information to the Engineer outlining the integration of the Major and Unusual Structure into the overall approach to the project. Where applicable to the project, include, but do not limit this information to:

1. The overall construction program for the duration of the Contract. Clearly show the Milestone dates. (For example, the need to open a structure by a certain time for traffic operations.)
2. The overall construction sequence. The order in which individual structures are to be built, the sequence in which individual spans of girders or cantilevers are erected, and the sequence in which spans are to be made continuous and the order that components are to be installed (such as mechanical and electrical devices in moveable bridges).
3. The general location of any physical obstacles to construction that might impose restraints or otherwise affect the construction, and an outline of how to deal with such obstacles while building the structure(s). (For example, obstacles might include road, rail and waterway clearances, temporary diversions, transmission lines, utilities, property, and the Contractor's own temporary works, such as haul roads, cofferdams, plant clearances and the like.)
4. The approximate location of any special lifting equipment in relation to the structure, including clearances required for the operation of the equipment. (For example, crane positions, operating radii and the like.)



5. The approximate location of any temporary falsework, and the conceptual outline of any special erection equipment. Provide the precise locations and details of attachments, fixing devices, loads, etc. in later detailed submittals.

6. An outline of the handling, transportation, and storage of fabricated components, such as girders or concrete segments. Provide the precise details in later detailed submittals.

7. Any other information pertinent to the proposed scheme or intended approach.

Clearly and concisely present the above information on as few drawings as possible in order to provide an overall, integrated summary of the intended approach to the project. The Department will use these drawings for information, review planning, and to assess the Contractor's approach in relation to the intent of the original design. Submittal to and receipt by the Engineer does not constitute any Department acceptance or approval of the proposals shown thereon. Include the details of such proposals on subsequent detailed shop drawing submittals. Submit timely revisions and re-submittals for all variations from these overall scheme proposals.

**5-1.4.8 Modifications for Construction:** Where the Engineer allows the Contractor to make modifications to the permanent works for the purposes of expediting the Contractor's chosen construction methods, the Contractor shall submit proposals to the Engineer of Record for review and approval prior to modifying the works. Submit proposals for minor modifications under the shop drawing process. Indicate on all drawings the deviations from the Contract Documents and itemize all deviations in the letter of transmittal. The Department will require additional submittals and/or submittal under a Cost Savings Initiative Proposal for major modifications.

Minor modifications are those items that, in the opinion of the Engineer, do not significantly affect the quantity of measured work, or the integrity or maintainability of the structure or its components. (For example, adjusting concrete dimensions, substituting steel plate sizes, changing reinforcing bar size and spacing, etc., all within the acceptable limits of the design.)

Major modifications are any modifications that, in the opinion of the Engineer, significantly affect the quantity of measured work, or the integrity or maintainability of the structure or its' components. (For example, substituting alternative beam sizes and spacings, changing material strength or type, and the like.). Submit signed and sealed revised sheets to the Engineer for any such revisions to the Contract Plans prior to submitting shop drawings.

The Engineer's decision on the delineation between a minor and a major modification and the disposition of a proposal is final.

**5-1.4.9 Cost of Shop Drawings:** Include the cost of ~~shop and working shop~~ drawings submittal in the Contract prices for the work requiring the ~~shop and working shop~~ drawings. The Department will not pay the Contractor additional compensation for such drawings.

#### **5-1.5 Certifications:**

**5-1.5.1 Special Erection Equipment:** Prior to its use, ensure that the Specialty Engineer personally inspects the special erection equipment and submits a written certification to the Engineer that the equipment has been fabricated in accordance with the submitted drawings and calculations. In addition, after assembly, ensure that the Specialty Engineer observes the

equipment in use and submits a written certification to the Engineer that such equipment is being used as intended and in accordance with the submitted drawings and calculations. In each case, the Specialty Engineer ~~will~~ **must** sign and seal the letter of certification.

**5-1.5.2 Falsework and Shoring Requiring Shop Drawings:** After its erection or installation but prior to the application of any superimposed load, ensure that a Specialty Engineer or a designee inspects the falsework and certifies to the Engineer in writing that the falsework has been constructed in accordance with the materials and details shown on the submitted drawings and calculations. The letter of certification ~~will~~ **must** be signed and sealed by the Specialty Engineer. Where so directed in the shop drawings, ensure all welds are performed by welders qualified under AWS D1.5 for the type of weld being performed.

**5-1.5.3 Temporary Formwork:** For Construction Affecting Public Safety and for Major and Unusual Structures, prior to the placement of any concrete, ensure that a Specialty Engineer or a designee inspects the formwork and submits a written certification to the Engineer that the formwork has been constructed to safely withstand the superimposed loads to which it will be subjected. ~~Ensure that the Specialty Engineer signs and seals the letter of certification~~  
**The Specialty Engineer must sign and seal the letter of certification.**

**5-1.5.4 Erection:** For Construction Affecting Public Safety, submit an erection plan signed and sealed ~~erection plan to the~~ **by the Specialty Engineer to the** Engineer **at least four weeks** prior to erection commencing. ~~in accordance with the submittal timeframes described in the RFP.~~ Include as part of this submittal signed and sealed calculations and details for any falsework, bracing or other connection(s) supporting the structural elements shown in the erection Plan. Unless otherwise specified in the Plans, erection Plans are not required for simple span precast prestressed concrete girder bridges with spans of 170 feet or less.

At least two weeks prior to beginning erection, conduct a Pre-erection meeting to review the details of the plan with the Specialty Engineer that signed and sealed the plan, and any Specialty Engineers that may inspect the work, and the Engineer.

After erection of the elements, but prior to opening of the facility below the structure, ensure that a Specialty Engineer or a designee has inspected the erected member. Ensure that the Specialty Engineer has submitted a written certification to the Engineer that the structure has been erected in accordance with the signed and sealed erection plan.

For structures without temporary supports but with temporary girder bracing systems, perform, as a minimum, weekly inspections of the bracing until all the diaphragms and cross frames are in place. For structures with temporary supports, perform daily inspections until the temporary supports are no longer needed as indicated in the erection plans. Submit written documentation of the inspections to the Engineer within 24 hours of the inspection

**5-1.6 Corrections for Construction Errors:** For work that the Contractor constructs incorrectly or does not meet the requirements of the Contract Documents, the Contractor has the prerogative to submit an acceptance proposal to the Engineer for review and disposition. The acceptance proposal shall describe the error or defect and either describe remedial action for its correction or propose a method for its acceptance. In either case, the acceptance proposal shall address structural integrity, aesthetics, maintainability, and the effect on Contract Time. The Department will judge any such proposal for its effect on these criteria and also for its effect on Contract Administration.

When the Engineer judges that a proposal infringes on the structural integrity or maintainability of the structure, the Contractor's Engineer of Record will perform a technical

assessment and submit it to the Engineer for approval. Do not take any corrective action without the Engineer's written approval.

Carry out all approved corrective construction measures at no expense to the Department.

Notwithstanding any disposition of the compensation aspects of the defective work, the Engineer's decision on the technical merits of a proposal is final.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 2, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **007**  
Proposed Specification: **0071101 Legal Requirements and Responsibility to the Public.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operation Office to include instructions for protecting all fiber optic cables.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC (REV 2-01-21)

SUBARTICLE 7-11.1 is deleted and the following substituted:

**7-11.1 General:** Preserve from damage all existing property within the project limits of or in any way affected by the Work, the removal or destruction of which is not specified in the Plans. This applies to, but is not limited to, public and private property, public and private utilities (except as modified by the provisions of 7-11.5), trees, shrubs, crops, sod, signs, monuments, fences, guardrail, pipe and underground structures, Intelligent Transportation Systems (ITS) facilities, traffic control signals and devices, highway lighting, and public highways (except natural wear and tear of highway resulting from legitimate use thereof by the Contractor).

Department owned underground facility locations shown in the Plans are approximate. Unless otherwise shown in the Plans, Department owned underground facilities will not be located by the Department nor through notification to "Sunshine 811". Locate all fiber optic cables. Provide a fiber optic cable locator in accordance with Section 633.

Whenever the Contractor's activities damage such existing property, immediately restore it to a condition equal to or better than that existing at the time such damage occurred, at no expense to the Department. Temporary repairs may be used to immediately restore ITS facilities and traffic control signals and devices. Permanent repairs to ITS facilities and traffic control signals and devices shall be made within 90 days of any temporary repairs and prior to final acceptance of the project. Submit permanent ITS facility repair plans to the Engineer prior to beginning repair work.

Protect existing bridges during the entire construction period from damage caused by the Work. Immediately repair, at no expense to the Department, all damage to existing bridges caused by the Work, prior to continuing the Work. The Department will not require the Contractor to provide routine repairs or maintenance for such structures.

Direct special attention to the protection of all geodetic monuments, horizontal or vertical, and Public Land Survey Corners located within the project. If any geodetic monument or Public Land Survey Corner, located within the project, is at risk of being damaged or destroyed, immediately notify the Engineer. Locate and replace any damaged or destroyed geodetic monuments or Public Land Survey Corners under the direction of a Professional Surveyor and Mapper registered in the State of Florida.

Whenever the actions of a third party damage such existing property and is not otherwise due to any fault or activities of the Contractor, either restore it to a condition equal to or better than that existing at the time such damage occurred or provide access and coordinate with the Department's maintenance Contractor in accordance with 8-4.4 as directed by the Engineer. The Department will compensate the Contractor for the costs associated with the repairs for restoring the existing property in accordance with 4-4. Theft and vandalism are considered damage caused by a third party.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 3, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **007**  
Proposed Specification: **0071104 LEGAL REQUIREMENTS AND  
RESPONSIBILITY TO THE PUBLIC.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Catherine Bradley to remove Florida Gulf and Atlantic Railroad (FGA) requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/jj

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC**  
**(REV 9/28/20)**

SUBARTICLE 7-11.4.1.2 is deleted,

~~7-11.4.1.2 Florida Gulf and Atlantic Railroad (FGA): Contact FGA at 615-791-0630 in addition to the requirements in Section 7-11.4.1.~~

SUBARTICLE 7-11.4.2.4 is deleted and the following is substituted:

~~7-11.4.2.4 FGA: Complete the On-Track Contractor Roadway Worker Training Course for FGA Railroad. Contact FGA Railroad at 1-615-791-0630 for training information.~~

**7-11.4.2.5<sup>4</sup> South Florida Rail Corridor (SFRC):** Complete the On-Track Contractor Roadway Worker Training Course for South Florida Regional Transportation Authority (SFRTA) Railway. Contact SFRTA at 954-788-7920 for training information.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 8, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **008**  
Proposed Specification: **0080703 Prosecution and Progress.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Latashi Kitchen from the State Construction Office to include existing language from the Department's Weather Letter.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**PROSECUTION AND PROGRESS**  
**(REV 2-1-20)**

SUBARTICLE 8-7.3.2 is deleted and the following substituted:

**8-7.3.2 Contract Time Extensions:** The Department may grant an extension of Contract Time when a controlling item of work is delayed by factors not reasonably anticipated or foreseeable at the time of bid. The Department may allow such extension of time only for delays occurring during the Contract Time period or authorized extensions of the Contract Time period. When failure by the Department to fulfill an obligation under the Contract results in delays to the controlling items of work, the Department will consider such delays as a basis for granting a time extension to the Contract.

Whenever the Engineer suspends the Contractor's operations, as provided in 8-6, for reasons other than the fault of the Contractor, the Engineer will grant a time extension for any delay to a controlling item of work due to such suspension. The Department will not grant time extensions to the Contract for delays due to the fault or negligence of the Contractor.

The Department does not include an allowance for delays caused by the effects of inclement weather or suspension of Contractor's operations as defined in 8-6.4, in establishing Contract Time. The Engineer will continually monitor the effects of weather and, when found justified, grant time extensions on either a bimonthly or monthly basis. The Engineer will not require the Contractor to submit a request for additional time due to the effects of weather.

The Department will grant time extensions, on a day for day basis, for delays caused by the effects of rains or other inclement weather conditions, related adverse soil conditions or suspension of operations as defined in 8-6.4 that prevent the Contractor from productively performing controlling items of work resulting in:

1. The Contractor being unable to work at least 50% of the normal work day on pre-determined controlling work items; or
2. The Contractor must make major repairs to work damaged by weather, provided that the damage is not attributable to the Contractor's failure to perform or neglect; and provided that the Contractor was unable to work at least 50% of the normal workday on pre-determined controlling work items.

When the Department grants a time extension due to rains or other inclement weather, the Contractor shall submit any objection to the additional time in writing within ten calendar days from receipt of written notice from the Engineer. Failure to submit a written appeal within ten calendar days from receipt of the written notice shall constitute a waiver of any and all rights to appeal the Department's decision at a later time.

No additional compensation will be made for delays caused by the effects of inclement weather.

The Department will consider the delays in delivery of materials or component equipment that affect progress on a controlling item of work as a basis for granting a time extension if such delays are beyond the control of the Contractor or supplier. Such delays may include an area-wide shortage, an industry-wide strike, or a natural disaster that affects all feasible sources of supply. In such cases, the Contractor shall submit substantiating letters from a representative number of manufacturers of such materials or equipment clearly confirming that the delays in delivery were the result of an area-wide shortage, an industry-wide strike, etc. No



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 14, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **008**  
Proposed Specification: **0081002 Prosecution and Progress.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Ashley Anderson from the State Construction Office to update the Liquidated Damages rate per the Florida Statutes and include language to adjust the rate when all contract work is complete.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PROSECUTION AND PROGRESS**  
**(REV 11-09-20)**

SUBARTICLE 8-10.2 is deleted and the following substituted:

**8-10.2 Amount of Liquidated Damages:** Applicable liquidated damages are the amounts established in the following schedule:

Original Contract Amount	Daily Charge Per Calendar Day
\$50,000 and under.....	<del>\$868</del> <u>1,015</u>
Over \$50,000 but less than \$250,000.....	<del>\$882</del> <u>1,045</u>
\$250,000 but less than \$500,000.....	<del>\$1,197</del> <u>70</u>
\$500,000 but less than \$2,500,000.....	<del>\$1,694</del> <u>0</u>
\$2,500,000 but less than \$5,000,000.....	<del>\$2,579</del> <u>2</u>
\$5,000,000 but less than \$10,000,000.....	<del>\$3,785</del> <u>6</u>
\$10,000,000 but less than \$15,000,000.....	<del>\$4,769</del> <u>344</u>
\$15,000,000 but less than \$20,000,000.....	<del>\$5,855</del> <u>74</u>
\$20,000,000 and over.....	<del>\$9,214</del> <u>10,203</u> plus 0.00005 of any amount over \$20 million (Round to nearest whole dollar)

The Engineer may approve adjustments to the liquidated damages amounts in accordance with the Construction Project Administration Manual (CPAM) provided all contract work is complete.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **102**  
Proposed Specification: **1020200 Maintenance of Traffic.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the State Estimates Office to modify Section 102 to separate Final Surface measurement in the Standard Specification. The change also affects Sections 706 and 710, addressed in separate memos.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**MAINTENANCE OF TRAFFIC  
(REV 09-28-20)**

ARTICLE 561-2 is deleted and the following substituted:

**102-2 Materials.**

Meet the following requirements:

Bituminous Adhesive.....	Section 970
Temporary Raised Pavement Markers.....	Section <del>990</del> 970
Paint .....	Section 971
Removable Tape .....	Section 990
Glass Spheres .....	Section 971
Temporary Traffic Control Device Materials .....	Section 990
Retroreflective and Nonreflective Sheeting for Temporary Traffic Control Devices .....	Section 994

SUBARTICLE 102-10.4 is deleted and the following substituted:

**102-10.4 Temporary Raised Pavement Markers (RPMs):** ~~Use Class B RPMs except for work that consists of ground in rumble strips at centerline locations. For ground in rumble strips at centerline locations, use temporary RPMs in accordance with Section 710. Provide only temporary RPMs listed on the APL.~~ Install all markers in accordance with ~~the manufacturer's recommendations, the Standard Plans, and~~ Section 706. After initial installation, replace broken or missing temporary RPMs in locations where more than three consecutive temporary RPMs are broken or missing at no expense to the Department.

SUBARTICLE 102-11.20 is deleted and the following substituted:

**102-11.20 Work Zone Pavement Markings:** Painted pavement markings will be paid as specified in 710-10. The quantity of removable tape to be paid for solid, 10'-30' skip, 3'-9' dotted, 6'-10' dotted, and 2'-4' dotted lines will be the length, in gross miles, authorized and acceptably applied under this Section and certified as installed/used on the project. The quantity of removable tape to be paid for transverse lines will be the length, in linear feet, authorized and acceptably applied under this Section and certified as installed/used on the project. The quantity of removable tape to be paid for pavement messages, symbols, and arrows will be per each, authorized and acceptably applied under this Section and certified as installed/used on the project. ~~The quantity of temporary RPMs to be paid will be the number of RPMs authorized and acceptably applied.~~

SUBARTICLE 102-11.26 is deleted and the following substituted:

**102-11.27 Temporary Raised Pavement Markers (RPMs):** The quantity of Class D temporary RPMs to be paid will be the number of RPMs authorized and acceptably applied. Class B temporary RPMs will be paid in accordance with Section 706.

ARTICLE 102-13 is expanded by the following new Subarticle:

**102-13.26 Temporary Raised Pavement Markers (RPMs):** Prices and payment will be full compensation for furnishing, installing, and removing Class D temporary RPMs.

**102-13.26 Payment Items:** Payment will be made under:

- ~~Item No. 102 1 Maintenance of Traffic lump sum.~~
- ~~Item No. 102 2 Special Detour lump sum.~~
- ~~Item No. 102 3 Commercial Material for Driveway Maintenance per cubic yard.~~
- ~~Item No. 102 4 Pedestrian Special Detour lump sum.~~
- ~~Item No. 102 14 Traffic Control Officer per hour.~~
- ~~Item No. 102 30 Temporary Highway Lighting lump sum.~~
- ~~Item No. 102 60 Work Zone Sign per each per day.~~
- ~~Item No. 102 61 Business Sign each.~~
- ~~Item No. 102 62 Barrier Mounted Work Zone Sign per each per day~~
- ~~Item No. 102 71 Temporary Barrier per foot.~~
- ~~Item No. 102 75 Temporary Lane Separator per foot~~
- ~~Item No. 102 73 Temporary Guardrail per foot.~~
- ~~Item No. 102 74 Channelizing Devices~~
- ~~Item No. 102 76 Arrow Board per each per day.~~
- ~~Item No. 102 78 Temporary Raised Pavement Markers each.~~
- ~~Item No. 102 81 Temporary Crash Cushion, Gating per location.~~
- ~~Item No. 102 89 Temporary Crash Cushion, Redirective per location.~~
- ~~Item No. 102 94 Glare Screen per foot.~~
- ~~Item No. 102 99 Portable Changeable Message Sign per each per day.~~
- ~~Item No. 102 104 Temporary Signalization and Maintenance per intersection per day.~~
- ~~Item No. 102 107 Temporary Traffic Detection and Maintenance per intersection per day.~~
- ~~Item No. 102 115 Type III Barricade per each per day.~~
- ~~Item No. 102 120 Temporary Signal for Lane Closures on Two Lane, Two-Way Roadways per each per day.~~
- ~~Item No. 102 150 Portable Regulatory Sign per each per day.~~
- ~~Item No. 102 150 Radar Speed Display Unit per each per day.~~
- ~~Item No. 102 909 Temporary Raised Rumble Strips per day.~~
- ~~Item No. 102 913 Removable Tape.~~
- ~~Item No. 710 Painted Pavement Markings.~~
- ~~Item No. 711 Thermoplastic Pavement Markings.~~

ARTICLE 102-13 is expanded by the following new Subarticle:

**102-13.27 Payment Items:** Payment will be made under:

- Item No. 102- 1- Maintenance of Traffic - lump sum.
- Item No. 102- 2- Special Detour - lump sum.
- Item No. 102- 3- Commercial Material for Driveway Maintenance - per cubic yard.
- Item No. 102- 4- Pedestrian Special Detour - lump sum.
- Item No. 102- 14- Traffic Control Officer - per hour.
- Item No. 102- 30- Temporary Highway Lighting - lump sum.
- Item No. 102- 60- Work Zone Sign - per each per day.
- Item No. 102- 61- Business Sign - each.
- Item No. 102- 62- Barrier Mounted Work Zone Sign – per each per day
- Item No. 102- 71- Temporary Barrier - per foot.
- Item No. 102- 75- Temporary Lane Separator - per foot
- Item No. 102- 73- Temporary Guardrail - per foot.
- Item No. 102- 74- Channelizing Devices
- Item No. 102- 76- Arrow Board - per each per day.
- Item No. 102- 78- Temporary Raised Pavement Markers, Class D - each.
- Item No. 102- 81- Temporary Crash Cushion, Gating - per location.
- Item No. 102- 89- Temporary Crash Cushion, Redirective - per location.
- Item No. 102- 94- Glare Screen - per foot.
- Item No. 102- 99- Portable Changeable Message Sign - per each per day.
- Item No. 102-104- Temporary Signalization and Maintenance - per intersection per day.
- Item No. 102-107- Temporary Traffic Detection and Maintenance - per intersection per day.
- Item No. 102-115- Type III Barricade - per each per day.
- Item No. 102-120- Temporary Signal for Lane Closures on Two-Lane, Two-Way Roadways – per each per day.
- Item No. 102-150- Portable Regulatory Sign - per each per day.
- Item No. 102-150- Radar Speed Display Unit - per each per day.
- Item No. 102-909- Temporary Raised Rumble Strips - per day.
- Item No. 102-913- Removable Tape.
- Item No. 710- Painted Pavement Markings.
- Item No. 711- Thermoplastic Pavement Markings.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **102**  
Proposed Specification: **1020300 Maintenance of Traffic.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the Construction Office to support the changes made to the 102 series of the Standard Plans for FY21-22 and FDM. The updates also include current practice requirements for AFADs.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## MAINTENANCE OF TRAFFIC (REV 1-19-20)

ARTICLE 102-3 is deleted and the following substituted:

### 102-3 Specific Requirements.

**102-3.1 Beginning Date of Contractor's Responsibility:** Maintain traffic starting the day work begins on the project or on the first day Contract Time is charged, whichever is earlier.

**102-3.2 Worksite Traffic Supervisor:** Provide a Worksite Traffic Supervisor who is responsible for initiating, installing, and maintaining all temporary traffic control devices as described in this Section and the Contract Documents. Provide all equipment and materials needed to set up, take down, maintain traffic control, and handle traffic-related situations. Use approved alternate Worksite Traffic Supervisors when necessary.

The Worksite Traffic Supervisor must meet the personnel qualifications specified in Section 105.

The Worksite Traffic Supervisor is to perform the following duties:

1. On site direction of all temporary traffic control on the project.
2. Is on site during all set up and take down, and performs a drive through inspection immediately after set up.
3. Is on site during all nighttime operations ensuring proper temporary traffic control.
4. Immediately corrects all safety deficiencies and corrects minor deficiencies that are not immediate safety hazards within 24 hours.
5. Is available on a 24 hour per day basis and present at the site within 45 minutes after notification of an emergency situation and is prepared to respond to maintain temporary traffic control or to provide alternate traffic arrangements.
6. Conducts daily daytime and weekly nighttime inspections of projects with predominately daytime work activities, and daily nighttime and weekly daytime inspections of projects with predominantly nighttime work activities of all traffic control devices, traffic flow, pedestrian, bicyclist, and business accommodations.

Advise the project personnel of the schedule of these inspections and give them the opportunity to join in the inspection as deemed necessary. ~~Pedestrians are to be accommodated with a safe, accessible travel path around work sites separated from mainline traffic in compliance with the Americans with Disabilities Act (ADA) Standards for Transportation Facilities. Maintain existing or detour bicycle facilities satisfactorily throughout the project limits. Existing businesses in work areas are to be provided with adequate entrances for vehicular and pedestrian traffic during business hours.~~

The Department may disqualify and remove from the project a Worksite Traffic Supervisor who fails to comply with the provisions of this Section. The Department may temporarily suspend all activities, except traffic, erosion control and such other activities that are necessary for project maintenance and safety, for failure to comply with these provisions.

**102-3.3 Lane Closures:** Approval for all lane closures, mobile operations, and traffic pacing operations is required. Submit routine requests to the Engineer fourteen calendar days in advance of planned lane closures, mobile operations, and traffic pacing operations. For unforeseen events that require cancelling or rescheduling lane closures, mobile operations, and traffic pacing operations, revise the lane closure request as soon as possible.

102-3.3.1 Traffic Pacing: In addition to dates and locations, include a pacing plan outlining the expected equipment and number of traffic control officers required, the proposed traffic pacing lengths and durations, the available existing egresses in the event of an emergency, and a contingency plan in the event of an equipment failure.

102-3.4 Pedestrian and Bicycle Accommodations: When an existing pedestrian or bicycle way is located within a traffic control work zone, accommodation must be maintained and provision for the disabled must be provided. Pedestrians are to be accommodated with a safe, accessible travel path around work sites separated from mainline traffic in compliance with the Americans with Disabilities Act (ADA) Standards for Transportation Facilities. Maintain existing or detour bicycle facilities satisfactorily throughout the project limits. Advanced notification of sidewalk closures and marked detours shall be provided by appropriate signs. Only approved pedestrian longitudinal channelizing devices may be used to delineate temporary traffic control zone pedestrian walkway. Existing businesses in work areas are to be provided with adequate entrances for vehicular and pedestrian traffic during business hours.

ARTICLE 102-5 is deleted and the following substituted:

### **102-5 Traffic Control.**

**102-5.1 Standards:** FDOT Standard Plans are the minimum standards for the use in the development of all TCPs. The MUTCD, Part VI is the minimum national standard for traffic control for highway construction, maintenance, and utility operations. Follow the basic principles and minimum standards contained in these documents for the design, application, installation, maintenance, and removal of all traffic control devices, warning devices and barriers which are necessary to protect the public and workers from hazards within the project limits.

**102-5.2 Maintenance of Roadway Surfaces:** Maintain all lanes that are being used for the MOT, including those on detours and temporary facilities, under all weather conditions. Keep the lanes reasonably free of dust, potholes and rutting. Provide the lanes with the drainage facilities necessary to maintain a smooth riding surface under all weather conditions.

**102-5.3 Number of Traffic Lanes:** Maintain one lane of traffic in each direction. Maintain two lanes of traffic in each direction at existing four (or more) lane cross roads, where necessary to avoid undue traffic congestion. ~~Construct each lane used for MOT at least as wide as the traffic lanes existing in the area before commencement of construction.~~ Do not allow traffic control and warning devices to encroach on lanes used for MOT.

The Engineer may allow the Contractor to restrict traffic to one-way operation for short periods of time provided that the Contractor employs adequate means of traffic control and does not unreasonably delay traffic. When a construction activity requires restricting traffic to one-way operations, locate the flaggers within view of each other when possible. When visual contact between flaggers is not possible, equip them with 2-way radios, official, or pilot vehicles, or use traffic signals.

**102-5.4 Crossings and Intersections:** Provide and maintain adequate accommodations for intersecting and crossing traffic. Provide signing for the control of traffic entering and leaving work zones by way of intersecting cross roads to make drivers aware of work zone conditions. Do not block or unduly restrict any median opening, road or street crossing the project unless approved by the Engineer. Before beginning any construction, submit to the Engineer the names and phone numbers of persons that can be contacted when signal operation malfunctions.

**102-5.5 Access for Residences and Businesses:** Provide continuous access to all residences and all places of business.

**102-5.6 Protection of the Work from Injury by Traffic:** Where traffic would be injurious to a base, surface course, or structure constructed as a part of the work, maintain all traffic outside the limits of such areas until the potential for injury no longer exists.

**102-5.7 Flagger:** Provide flaggers to control traffic when traffic in both directions must use a single lane and in other situations as required. All flaggers must meet the personnel qualifications specified in Section 105.

**102-5.8 Conflicting Pavement Markings:** Remove all existing pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) that conflict with temporary paths of vehicles, bicycles or pedestrians when the conflict will exceed 24 hours. Use any method, other than paint or sprayed asphalt, approved by the Engineer to remove existing pavement markings. ~~Where the lane use or where normal vehicle or pedestrian paths are altered during construction, remove all pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) that will conflict with the adjusted vehicle or pedestrian paths. Use of paint to cover conflicting pavement markings is prohibited.~~ Remove conflicting pavement markings using a method that will not damage the surface texture of the pavement and which will eliminate the previous marking pattern regardless of weather and light conditions.

Remove all pavement markings that will ~~be in~~ conflict with “the next phase of operation” for vehicle, bicycle, and pedestrian paths as described above, before opening to vehicle or bicycle traffic or use by pedestrians.

Cost for removing conflicting pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) to be included in Maintenance of Traffic, lump sum.

**102-5.9 Vehicle and Equipment Visibility:** Equip all pickups and automobiles used on the project with a minimum of one Class 2 warning light that meets the Society of Automotive Engineers Recommended Practice SAE J595, dated November 1, 2008, or SAE J845, dated December 1, 2007, and incorporated herein by reference. Existing lights that meet SAE J845, dated March, 1992, or SAE J1318, dated April, 1986, may be used to their end of service life. The warning lights must be a high intensity amber or white rotating, flashing, oscillating or strobe light. Lights must be unobstructed by ancillary vehicle equipment such as ladders, racks or booms and be visible 360 degrees around the vehicle. If the light is obstructed, additional lights will be required. The lights must be operating when the vehicle is in a work area where a potential hazard exists, when operating at less than the average speed for the facility while performing work activities, making frequent stops or called for in the Plans or Standard Plans.

Equip all other vehicles and equipment with a minimum of 4 square feet of retroreflective sheeting or warning lights.

**102-5.10 No Waiver of Liability:** Conduct operations in such a manner that no undue hazard results due to the requirements of this Article. The procedures and policies described herein in no way acts as a waiver of any terms of the liability of the Contractor or his surety.

**102-5.11 Work Zone Speed:** Use the work zone speed in the TTCP. When field conditions warrant work zone speeds different from those in the TTCP, submit signed and sealed documentation to justify reducing the work zone speed limit to the Engineer for approval, or the Engineer may request the District Traffic Operation Engineer to investigate the need.

Sign work zone speed reductions in accordance with Standard Plans, Index 102-600 and the TTCP.

**102-5.12 Limited Access Temporary Openings: When required by the Contract Documents, construct temporary openings in accordance with the Standard Plans. Submit a written request identifying the specific locations within the project limits to the Engineer.**

Locate temporary openings in areas with adequate sight distance. Do not locate temporary openings with 1.5 miles of interchanges or within 2000 feet of the acceleration-deceleration lanes at rest areas, median openings, other access openings, or other highway service areas. Do not remove existing guardrail or barrier for temporary openings.

Use temporary pavement for the acceleration-deceleration lane surface of the temporary opening. Commercial material may be used for the driveway surface of the temporary opening. Install a gate at the limited access fence and keep the gate locked when the temporary opening is not in use.

Do not use temporary openings to transport materials to or from any other project.

Failure to comply with this Section and the Standard Plans, 102 Series shall be cause for the Engineer to terminate usage of the temporary opening. When the temporary opening is no longer needed, remove immediately and restore the area to pre-construction condition.

SUBARTICLE 102-6.2 is deleted and the following substituted:

**102-6.2 Construction:** Plan, construct, and maintain detours for the safe passage of traffic in all conditions of weather. Provide the detour with all facilities necessary to meet this requirement.

Where pedestrian facilities are detoured, blocked or closed during the work, provide safe alternate accessible routes through or around the work zone meeting the requirements of the ADA Standards for Transportation Facilities. When temporary walkway surfaces and ramps are required to be constructed, ensure surfaces are stable, firm, slip resistant, and kept free of any obstructions and hazards such as holes, debris, mud, construction equipment and stored materials. Install detectable warnings on temporary ramps in accordance with Section 522.

When the Plans call for the Department to furnish detour bridge components, construct the pile bents in accordance with the Plans, unless otherwise authorized by the Engineer.

Provide two Contractor representatives, who will be directly involved in the erection of Department-owned temporary bridging, to attend a mandatory one-day training session to be conducted at the Department's storage facility. No bridging will be released to the Contractor prior to the completion of this training.

Submit the following: company name, phone number, office address, project contact person, names of the representatives who will attend the training described above, project number, detour bridge type, bridge length, span length, location and usage time frames, to the Engineer at least 30 calendar days before the intended pick-up date, to obtain the storage facility location and list of components for the project. Upon receipt, the Engineer will, within 10 calendar days submit an approved material list to the Contractor and the appropriate Department storage yard.

Submit the name of the representative with authority to pick up components, to the Engineer at least 10 calendar days before the proposed pick-up date. The Department is not

obligated to load the bridge components without this notice. Take responsibility and sign for each item loaded at the time of issuance.

Provide timber dunnage, and transport the bridge components from the designated storage facility to the job site. Unload, erect, and maintain the bridge, then dismantle the bridge and load and return the components to the designated storage facility.

Notify the Engineer in writing at least 10 calendar days before returning the components. Include in this notice the name of the Contractor's representative authorized to sign for return of the bridge components. The yard supervisor is not obligated to unload the bridge components without this notice.

The Department will provide equipment and an operator at the Department's storage facility to assist in loading and unloading the bridge components. Furnish all other labor and equipment required for loading and unloading the components.

The Department's representative will record all bridge components issued or returned on the Detour Bridge Issue and Credit Ticket. The tickets must be signed by a Department and a Contractor representative, after loading or unloading each truck to document the quantity and type of bridging issued or returned.

Bind together all bridge components to be returned in accordance with the instructions given by the storage facility. The yard supervisor will repack components that are not packed in compliance with these instructions. Upon request, written packing instructions will be made available to the Contractor, before dismantling of the bridge for return to the Department's storage facility.

Assume responsibility for any shortage or damage to the bridge components. Monies due the Contractor will be reduced at the rate of \$35.00 per hour plus materials for repacking, repairs or replacement of bridge components.

The skid resistance of open steel grid decking on the detour bridge may decrease gradually after opening the bridge to traffic. The Department will furnish a pneumatic floor scabbler machine for roughening the roadway surface of the detour bridge decking. Provide an air compressor at the job site with 200 cubic feet per minute capacity, 90 psi air pressure for the power supply of the machine, and an operator. Transport the scabbler machine to and from the Department's structures shop. Repair any damage to the scabbler machine caused by operations at no expense to the Department. Perform scabbling when determined necessary by the Engineer. The Department will pay for the cost of scabbling as Unforeseeable Work in accordance with 4-4.

Return the bridge components to the designated storage facility beginning no later than 10 calendar days after the date the detour bridge is no longer needed, the date the new bridge is placed in service, or the date Contract Time expires, whichever is earliest. Return the detour bridging at an average of not less than 200 feet per week. Upon failure to return the bridge components to the Department within the time specified, compensate the Department for the bridge components not returned at the rate of \$5.00 per 10 feet, per day, per bridge, for single lane; and \$10.00 per 10 feet, per day, per bridge, for dual lane until the bridge components are returned to the Department.

SUBARTICLE 102-6.8 is deleted and the following substituted:

**102-6.8 Pedestrian or Bicycle Special Detour:** A pedestrian or bicycle special detour is defined as a temporary pedestrian or bicycle way that requires temporary pavement or other stable, firm, slip-resistant surface.

SUBARTICLE 102-9.1 is deleted and the following substituted:

**102-9.1 General:** Use only devices that are listed on the APL. Immediately remove or cover, using any method of covering approved by the Engineer, any existing or temporary devices that do not apply to current conditions.

The use of NCHRP Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features devices purchased prior to January 1, 2020 is permitted on projects let prior to January 1, 2030. All devices manufactured or purchased on or after January 1, 2020 must be MASH compliant in accordance with Section 990.

The APL number is to be permanently marked on the device at a readily visible location. Sheeting used on devices and pavement markings are exempt from this requirement.

Notify the Engineer in writing of any scheduled operation that will affect traffic patterns or safety sufficiently in advance of commencing such operation to permit review of the plan for the proposed installation of temporary traffic control devices.

Assign an employee the responsibility of maintaining the position and condition of all temporary traffic control devices throughout the duration of the Contract. Keep the Engineer advised at all times of the identification and means of contacting this employee on a 24 hour basis.

Maintain temporary traffic control devices in the correct position, properly oriented, clearly visible and clean, at all times. All applicable temporary traffic control devices must meet the classification category of Acceptable as defined in the American Traffic Safety Services Association (ATSSA) Quality Guidelines for Temporary Traffic Control Devices and Features. Temporary concrete barriers must meet the classification category of Acceptable defined in the Department's Temporary Concrete Barrier Evaluation Guide, which may be viewed at the following URL:

[https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/docs/default-source/content-docs/programmanagement/implemented/urlinspecs/files/temporaryconcretebarrierguide.pdf.pdf?sfvrsn=343b4c97\\_10](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/docs/default-source/content-docs/programmanagement/implemented/urlinspecs/files/temporaryconcretebarrierguide.pdf.pdf?sfvrsn=343b4c97_10). Pedestrian longitudinal channelizing devices (LCDs) must meet the classification category of Acceptable as defined in the Pedestrian LCD Evaluation Guide, which may be viewed at the following URL:

[https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/lcdevaluationguide.pdf?sfvrsn=166e0f16\\_2](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/lcdevaluationguide.pdf?sfvrsn=166e0f16_2). Immediately repair, replace or clean damaged, defaced or dirty devices. Traffic control devices must not be cleaned while installed/used. Use of warning lights on any temporary traffic control device is prohibited, with the exception of the trailer mounted portable regulatory signs.

Employ an approved independent Channelizing Device Supplier (CDS) to provide and maintain the condition of the following non-fixed channelizing devices: drums, cones, vertical panels, barricades, temporary tubular markers, and pedestrian longitudinal channelizing devices. Cones may be provided and maintained by the Contractor.

The CDS shall not be affiliated with the Contractor and must be approved by the Department. Department approved CDSs are listed on the State Construction Office website. CDSs seeking inclusion on the list must meet the requirements of 102-9.1.1. The CDS shall submit a monthly certification on letterhead that the channelizing devices mentioned above installed/used within the work zone meet classification category of Acceptable as defined in the Pedestrian LCD Evaluation Guide and the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features. The CDS shall submit the monthly certification on letterhead for channelizing devices installed/used within the work zone. The CDS certification shall include the following statement, "I certify that I have provided and maintained the following devices <list devices covered under the certification> in accordance with Pedestrian LCD Evaluation Guide and the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features." If the Contractor chooses to provide and maintain cones, the Contractor must submit a monthly Contractor certification on letterhead that all cones installed/used within the work zone meet acceptable standards as outlined in the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features. The Contractor certification shall include the following statement, "I certify that I have provided and maintained cones in accordance with the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features."

SUBARTICLE 102-9.2.3 is deleted and the following substituted:

**102-9.2.3 Barrier Mounted Signs:** If post mounting criteria cannot be achieved in accordance with Standard Plans, Index 102-600 and a barrier or traffic railing exists, use temporary sign criteria provided in Standard Plans, Index ~~700-013~~012 or Index 700-013. Use Standard Plans, Index 700-012 only when mounting the sign to the top of the barrier or traffic railing places the sign panel closer than two feet from the traveled way.

SUBARTICLE 102-9.5.2 is deleted and the following substituted:

**102-9.5.2 Pedestrian Longitudinal Channelizing Devices (LCDs):** Use LCDs listed on the APL for pedestrian use and meeting the requirements of Section 990 and the Standard Plans. Pedestrian LCDs must be interlocked except for the stand-alone unit placed perpendicular to a sidewalk. For pedestrian LCDs requiring internal ballasting, an indicator that clearly identifies the proper ballast level will be required. For pedestrian LCDs requiring external ballasting, the ballasting methods must be detailed in the APL drawings including ballasting type and minimum weight.

Ensure that joints on the pedestrian LCDs are free of sharp edges and have a maximum offset of 1/2 inch in any plane.

SUBARTICLE 102-9.12 is deleted and the following substituted:

**102-9.12 Portable Changeable Message Sign (PCMS):** ~~Furnish~~Use PCMSs or truck mounted changeable message signs that meet the requirements of Section 990 as required by the Plans and Standard Plans to supplement other temporary traffic control devices used in work

zones. Ensure that the PCMS display panel is raised to a fully upright position and is fully visible to motorists. Reduce the intensity of the flashers when using PCMS at night. Use PCMS with a minimum letter height of 18 inches. For facilities with posted speed limits of 45 mph or less, PCMS with a minimum letter height of 12 inches may be used.

Messages must have no more than two phases. The display time for each phase must be at least two seconds but no more than three seconds. The sum of the display time must be a maximum of six seconds.

SUBARTICLE 102-9.15 is deleted and the following substituted:

**102-9.15 Temporary Signalization and Maintenance:** Provide temporary signalization signals and maintenance-maintain signalization at existing, temporary, and new intersections including, but not limited to, the following:

1. Installation of temporary poles and span wire assemblies as shown in the Plans,
2. Temporary portable traffic signals as shown in the Plans,
3. Adding or shifting signal heads,
4. Trouble calls,
5. Maintaining intersection and coordination timing and preemption devices. Coordination timing will require maintaining functionality of system communications.

Restore any loss of operation within 12 hours after notification. Provide alternate temporary traffic control until the signalization is restored.

Provide temporary pedestrian signalization in accordance with the TTCP, and maintain pedestrian signalization at existing, temporary, and new intersections.

Provide traffic signal equipment that meets the requirements of the Standard Plans and 603-2. The Engineer may approve used signal equipment if it is in acceptable condition. Replacement components for traffic signal cabinet assemblies will be provided by the maintaining agency. For temporary signals used for lane closure operations on two-lane, two-way roadways meet the requirements in 102-9.21.

SUBARTICLE 102-9.19 is deleted and the following substituted:

**102-9.19 Automated Flagger Assistance Devices (AFAD):** Furnish, install, maintain, remove, and relocate AFADs in accordance with the Plans, Standard Plans, Index 102-603, and APL vendor drawings.

Position AFADs where they are clearly visible to oncoming traffic. AFADs may be placed on the centerline if they have been successfully crash tested in accordance with MASH TL-3 criteria. A gate arm is required in accordance with Section 990 if a single AFAD is used on the shoulder to control one direction of traffic.

The devices may be operated either by a single flagger at one end of the traffic control zone, from a central location, or by a separate flagger near each device location. Use only flaggers trained in accordance with Section 105 and in the operation of the AFAD. When in use, each AFAD must be in view of, and attended at all times by, the flagger operating the device.



Provide two flaggers on-site and use one of the following methods in the deployment of AFADs:

1. Place an AFAD at each end of the temporary traffic control zone, or
2. Place an AFAD at one end of the temporary traffic control zone and a flagger at the opposite end.

A single flagger may simultaneously operate two AFADs as described in (1) or a single AFAD as described in (2) if all of the following conditions are met:

1. The flagger has an unobstructed view of the AFAD(s),
2. The flagger has an unobstructed view of approaching traffic in both directions,

~~3. For two AFADs, the AFADs are less than 800 feet apart. For one AFAD, the AFAD and the flagger are less than 800 feet apart.~~

~~43. In the event of an AFAD malfunction, restore normal flagging operations with flaggers or immediately cease the flagging operation and reopen the roadway. Two flaggers are available on-site to provide normal flagging operations should an AFAD malfunction.~~

AFADs may be either a remotely controlled Stop/Slow AFAD mounted on either a trailer or a movable cart system, or a remotely controlled Red/Yellow Lens AFAD.

Illuminate the flagging station when the AFAD is used at night. When the AFAD is not in use, remove or cover signs and move the AFAD device outside the clear zone or shield it with a barrier.

AFADs will not be paid for separately. AFADs may be used as a supplement or an alternate to flaggers in accordance with the Plans, Standard Plans, Index 102-603, and the APL vendor drawings. Include the cost for AFADs in Maintenance of Traffic, Lump Sum.

**102-9.20 Temporary Lane Separator:** Furnish, install, maintain, remove and relocate temporary lane separator in accordance with the Plans and Standard Plans, Index 102-600. Anchor the portable temporary lane separator with a removable anchor bolt. Use epoxy on bridge decks where anchoring is not allowed. Remove the epoxy from the bridge deck by hydroblasting or other method approved by the Engineer. Repair any damage to the existing pavement caused by the removal of temporary lane separator.

SUBARTICLE 102-9.21 is deleted and the following substituted:

**102-9.21 Temporary Signals for Lane Closures on Two-Lane, Two-Way Roadways:** Furnish, install, maintain, remove, and relocate temporary signals for lane closure operations on two-lane, two-way roadways at the locations shown in the Plans. Temporary signals may be used, at the Contractor's option, as an alternate to flaggers for lane closure operations on two-lane, two-way roadways in accordance with Standard Plans, Index 102-606. Temporary signals can either be portable signals or span wire signals and must be listed on the APL. Provide two signal faces for each approach.

SUBARTICLE 102-11.4 is deleted and the following substituted:

**102-11.4 Commercial Material for Driveway Maintenance:** The quantity to be paid for will be the certified volume, in cubic yards, of all materials authorized by the Engineer,

acceptably placed and maintained for driveway maintenance. The volume, which is authorized to be reused, and which is acceptably salvaged, placed, and maintained in other designated driveways will be included again for payment. Commercial Material used for Temporary Openings will not be included for separate payment.

SUBARTICLE 102-11.22 is deleted and the following substituted:

**102-11.22 Temporary Lane Separator:** The quantity to be paid for will be the field measure, in feet, of temporary lane separator certified as installed/used on the project, including drainage gaps, completed and accepted. The cost of any pavement repairs due to removal is included in the cost of Maintenance of Traffic, lump sum.

SUBARTICLE 102-11.25 is deleted and the following substituted:

**102-11.25 Pedestrian or Bicycle Special Detours:** When a pedestrian or bicycle special detour is shown in the Plans, the work of constructing, maintaining, and subsequently removing such detour facilities will be paid for under pedestrian or bicycle special detour, lump sum. However, traffic control devices, warning devices, barriers, signing, pavement markings, and restoration to final configuration will be paid for under their respective pay items.

SUBARTICLE 102-11.26 is deleted and the following substituted:

**102-11.26 Type III Barricades:** The number of type III barricades certified as installed/used on the project will be paid for at the Contract unit price for type III barricades.

ARTICLE 102-11 is expanded by the following

**102-11.27 Limited Access Temporary Openings: Include all construction, maintenance, removal, and restoration costs of temporary openings in Maintenance of Traffic, lump sum. No separate payment will be made for commercial material, gates, or fence.**

ARTICLE 102-13.24 is deleted and the following substituted:

**102-13.24 Pedestrian or Bicycle Special Detours:** Price and payment will be full compensation for providing all pedestrian or bicycle special detours shown in the Plans.

SUBARTICLE 102-13.26 is deleted and the following substituted:

**102-13.26 Payment Items:** Payment will be made under:

- Item No. 102- 1- Maintenance of Traffic - lump sum.
- Item No. 102- 2- Special Detour - lump sum.

Item No. 102- 3-	Commercial Material for Driveway Maintenance - per cubic yard.
Item No. 102- 4-	Pedestrian <u>or Bicycle</u> Special Detour - lump sum.
Item No. 102- 14-	Traffic Control Officer - per hour.
Item No. 102- 30-	Temporary Highway Lighting - lump sum.
Item No. 102- 60-	Work Zone Sign - per each per day.
Item No. 102- 61-	Business Sign - each.
Item No. 102- 62-	Barrier Mounted Work Zone Sign – per each per day
Item No. 102- 71-	Temporary Barrier - per foot.
Item No. 102- 75-	Temporary Lane Separator - per foot
Item No. 102- 73-	Temporary Guardrail - per foot.
Item No. 102- 74-	Channelizing Devices
Item No. 102- 76-	Arrow Board - per each per day.
Item No. 102- 78-	Temporary Raised Pavement Markers - each.
Item No. 102- 81-	Temporary Crash Cushion, Gating - per location.
Item No. 102- 89-	Temporary Crash Cushion, Redirective - per location.
Item No. 102- 94-	Glare Screen - per foot.
Item No. 102- 99-	Portable Changeable Message Sign - per each per day.
Item No. 102-104-	Temporary Signalization and Maintenance - per intersection per day.
Item No. 102-107-	Temporary Traffic Detection and Maintenance - per intersection per day.
Item No. 102-115-	Type III Barricade - per each per day.
Item No. 102-120-	Temporary Signal for Lane Closures on Two-Lane, Two-Way Roadways – per each per day.
Item No. 102-150-	Portable Regulatory Sign - per each per day.
Item No. 102-150-	Radar Speed Display Unit - per each per day.
Item No. 102-909-	Temporary Raised Rumble Strips - per day.
Item No. 102-913-	Removable Tape.
Item No. 710-	Painted Pavement Markings.
Item No. 711-	Thermoplastic Pavement Markings.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 22, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **103**  
Proposed Specification: **1030101 Temporary Work Structures.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Scott Arnold from the Construction Office to include floating platforms and to remove the use of barges and other items since they are excluded in the Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**TEMPORARY WORK STRUCTURES**  
**(REV 11-12-20)**

SUBARTICLE 103-1.1 is deleted and the following substituted:

**103-1.1 Scope of Work:** Construct temporary work structures used solely to support construction equipment. Temporary structures include but are not limited to work bridges, elevated platforms, floating platforms, and rail systems. Items such as ~~barges, mats, or items~~ such as falsework or scaffolding are not included in this Section. If a temporary structure type other than the structure type shown in the plans is chosen, assume responsibility for obtaining all necessary permit revisions and the Engineer's approval. Conform to any limitations contained in the plans and permits. Do not place embankment outside the limits shown in the plans. The cost of the embankment, placing, compaction, and removal will be included in the lump sum price for Temporary Work Structure.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050101 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to include references to the density log book being updated in the Department's database.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## **CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 10-5-20)**

ARTICLE 105-1.1.2 is deleted and the following substituted:

**105-1.1.2 Databases:** Obtain access to the Department's databases prior to testing and material placement. Database access information is available through the Department's website. Enter all required and specified documentation and test results into the Department's s databases.

ARTICLE 105-3 is deleted and the following substituted:

### **105-3 Quality Control Program.**

Certain operations require personnel with specific qualifications. Certain materials require production under an approved Quality Control (QC) Plan to ensure that these materials meet the requirements of the Contract Documents. Applicable materials include hot mix asphalt, portland cement concrete (Sstructural), earthwork, cementitious materials, timber, steel and miscellaneous metals, galvanized metal products, prestressed and/or precast concrete products, drainage products, and fiber reinforced polymer products. For all applicable materials included in the Contract, submit a QC Plan prepared in accordance with the requirements of this Section to the Engineer. Do not incorporate any of these materials into the project prior to the Engineer's approval of the QC Plan.

Steel and Miscellaneous Metal products, including aluminum, are defined as the metal components of bridges, including pedestrian and moveable bridges, overhead and cantilevered sign supports, ladders and platforms, bearings, end wall grates, roadway gratings, drainage items, expansion joints, roadway decking, shear connectors, handrails, galvanized products, fencing, guardrail, light poles, high mast light poles, standard mast arm assemblies and Monotube assemblies, stay in-place forms, casing pipe, strain poles, fasteners, connectors and other hardware.

ARTICLE 105-7 is deleted and the following substituted:

### **105-7 Lab Qualification Program.**

Testing laboratories participating in the Department's Acceptance Program must have current Department qualification when testing materials that are used on Department projects. In addition, they must have one of the following:

1. Current AASHTO (AAP) accreditation.
2. Inspected on a regular basis per ASTM D 3740 for earthwork, ASTM D 3666 for asphalt and ASTM C 1077 for concrete for test methods used in the Acceptance Program, with all deficiencies corrected, and under the supervision of a Specialty Engineer.
3. Current Construction Materials Engineering Council (CMEC) program accreditation or other independent inspection program accreditation acceptable to the Engineer and equivalent to (1) or (2) above.

After meeting the criteria described above, submit a Laboratory Qualification Application to the Department. The application is available from the Department's website: <https://www.fdot.gov/materials/quality/programs/laboratoryqualification/index.shtm>. Obtain the Department's qualification prior to beginning testing. The Department may inspect the laboratory for compliance with the accreditation requirements prior to issuing qualification.

Meet and maintain the qualification requirements at all times. Testing without Department's qualification may result in a rejection of the test results. Continued qualifications are subject to satisfactory results from Department evaluations, including Independent Assurance evaluations. In case of suspension or disqualification, prior to resumption of testing, resolve the issues to the Department's satisfaction and obtain reinstatement of qualification. The following conditions may result in suspension of a laboratory's qualified status:

1. Failure to timely supply required information.
2. Loss of accredited status.
3. Failure to correct deficiencies in a timely manner.
4. Unsatisfactory performance.
5. Changing the laboratory's physical location without notification to the accrediting agency and the Engineer.
6. Delays in reporting the test data in the Department's database.
7. Incomplete or inaccurate reporting.
8. Using unqualified technicians performing testing.

Should any qualified laboratory falsify records, the laboratory qualification will be subject to revocation by the Engineer. Falsification of project-related documentation will be subject to further investigation and penalty under State and Federal laws.

It is prohibited for any contract laboratory or staff to perform Contractor QC testing and any other Acceptance Program testing on the same contract.

SUBARTICLE 105-8.2 is deleted and the following substituted:

**105-8.2 Quality Control (QC) Manager:** Designate a QC Manager who has full authority to act as the Contractor's agent to institute any and all actions necessary to administer, implement, monitor, and as necessary, adjust quality control processes to ensure compliance with the Contract Documents. The QC Manager must speak and understand English. The QC Manager must be on-site at the project on a daily basis or always available upon four hours' notice. Ensure that the QC Manager is qualified as such through the Construction Training and Qualification Program. The QC Manager and the Superintendent must not be the same individual.

Under the direction of the QC Manager, ~~and using Department's standard forms provided by the Engineer, summarize the daily QC activities including testing and material sampling. Since erasures are strictly prohibited on all reports and forms, use blue or colored ink. Do not use black ink. If manual corrections to original data are necessary, strike through, correct, and date the entry, including the initials of the person making the correction. Make copies of the completed forms available for the Department to review daily unless otherwise required in the Specifications. Ensure~~ ensure that the QC test data is entered into the Department's database on a daily basis. Use Department approved programs to generate the plots for the Earthwork Records System (ERS). Maintain all QC related reports and documentation for a period of three years



from final acceptance of the project. Make copies available for review by the Department upon request.

SUBARTICLE 105-8.4.1 is deleted and the following substituted:

**105-8.4.1 Earthwork Level I:** Ensure the technician who samples the soil and earthwork materials from the roadway project, takes earthwork moisture and density readings, and records those data into the ~~Density Log Book~~ ERS section of the Department's database, holds a CTQP Earthwork Construction Inspection Level I qualification.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section **105**  
Proposed Specification: **1050404MM63V2 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 2021, to the Materials Manual for Section 6.3 Volume II, Precast Concrete Drainage Structures and Box Culverts. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-01-20)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual.**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V1.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section **105**  
Proposed Specification: **1050404MM81V2 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 2021, to the Materials Manual for Section 8.1 Volume II, Precast Prestressed Concrete Products. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-01-20)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual.**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V1.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section **105**  
Proposed Specification: **1050404MM82V2 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 2021, to the Materials Manual for Section 8.2 Volume II, Producers of Incidental Precast/Prestressed Concrete Products. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-01-20)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual.**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V1.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section **105**  
Proposed Specification: **1050404MM84V2 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 2021, to the Materials Manual for Section 8.4 Volume II, Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-01-20)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual.**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V1.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section **105**  
Proposed Specification: **1050404MM86V2 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 2021, to the Materials Manual for Section 8.6 Volume II, Flowing Concrete for Precast/Prestressed Concrete Products. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-01-20)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual.**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V1.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section **105**  
Proposed Specification: **1050404MM92V2 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 2021, to the Materials Manual for Section 9.2 Volume II, Structural Concrete Production Facilities Guide. These revisions were proposed by Jose Armenteros from the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-01-20)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual.**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V1.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 7, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050806 Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by John Westphal from the Construction Office to remove the requirement for CTQP Concrete Field Inspector Level 2 on bridge approach slab concrete placements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS  
(REV 10-11-20)**

SUBARTICLE 105-8.6.2 is deleted and the following is substituted:

**105-8.6.2 Concrete Field Inspector - Level 2:** Ensure field inspectors responsible for the quality of concrete being placed on the following structure types are qualified CTQP Concrete Field Inspectors Level 2:

1. Moveable bridges
2. Bridges over a water opening of 1,000 feet or more
3. Bridges with a span of 190 feet or more
4. Cable supported or cable stayed bridges
5. Post-tensioned bridges
6. Steel girder or steel truss bridges
7. Multi-level roadways

With the exception of concrete traffic railing and bridge approach slab placements, a Level 2 Inspector must be present on the jobsite during all concrete placements. Prior to the placement of concrete, the inspector will inspect the element to be cast to ensure compliance with Contract Documents. A Level 2 Inspector's duties may include ensuring that concrete testing, inspection, and curing in the field are performed in accordance with the Contract Documents. The QC Inspector will inform the Verification Inspector of anticipated concrete placements and LOT sizes.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **107**  
Proposed Specification: **1070100 Litter Removal and Mowing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the State Estimates Office to simplify the documentation and measurement of small mowing areas.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction E

## LITTER REMOVAL AND MOWING (REV 12-17-20)

SECTION 107 is deleted and the following and substituted

### 107-1 Description.

Provide pickup, removal and disposal of litter within the project limits from the outside edge of travel way to the right of way line. Include the median on divided highways, from the inside edge of travel way to the inside edge of travel way. Litter includes; but is not limited to, bottles, cans, paper, tires, tire pieces, lumber, vehicle parts, metal junk, and brush debris.

~~Exclude any inaccessible areas and area identified in the Plans as new landscaping in accordance with the Contract Documents.~~

Mow turf or vegetation within the project limits. Turf consists of grasses planted in accordance with Section 570. Vegetation consists of planted and natural grasses, weeds, and other natural vegetation that have been previously mowed. ~~Exclude any areas identified in the Plans as new landscaping in accordance with the Contract Documents.~~

### 107-2 Operation.

~~107-2.1 Frequency: Begin litter removal in conjunction with the beginning of the project and continue per the frequency shown in the Plans, unless otherwise directed by the Engineer.~~

Begin litter removal and mowing when directed by the Engineer and continue ~~per the frequency in the Plans~~every 30 days, unless otherwise directed by the Engineer. Continue litter removal and mowing until final acceptance in accordance with 5-11. Mow all areas to obtain a uniform height of 6 inches.

After final acceptance, perform litter removal and mowing until new turf is established in accordance with 570-4 at no cost to the Department. Maintain turf and vegetation height between 6 inches and 12 inches. Do not include seed stalk or wildflowers when measuring height.

Perform litter removal prior to and in conjunction with mowing; however, the Engineer may direct litter pickups in addition to those performed in conjunction with mowing.

Do not mow new turf until a healthy root system is established. In designated wildflower areas, avoid cutting wildflowers when in bloom and when re-seeding.

**107-2.2 General:** Mow shoulders and medians concurrently so that not more than one mile will be left partially mowed at the conclusion of the working day. Mow turf and vegetation on slopes or around appurtenances concurrent with the mowing operation.

In areas saturated with standing water, mow or cut to the surface of the water using hand labor or other specialized equipment when standard equipment will cause damage.

Do not remove turf or other vegetation cuttings from the right-of-way, or rake or pick up the cuttings unless the cuttings are in the traveled ways, bike lanes, or sidewalk; are obstructing drainage structures; or are the result of cleaning the equipment.

**107-2.3 Limitations:** Maintain traffic in accordance with Section 102. When mowing within four feet of a travel lane, operate the equipment in the same direction of traffic, unless the adjacent lane is closed to traffic due to construction operations.

Perform all work during daylight hours.

**107-2.4 Disposal of Litter and Debris:** During each litter removal cycle, bag and remove all litter or piles at the end of each working day. Dispose of litter in accordance with applicable local and state laws. Do not store or stockpile litter within the project limits.

**107-3 Method of Measurement.**

~~For each litter removal cycle, the quantity to be paid will be the area, in acres, from which litter has been picked up, removed, and disposed, completed and accepted. The quantity will be determined by calculation using the lengths and widths based on the station to station dimensions shown in the plans.~~

~~For each mowing cycle, the quantity to be paid will be the area, in acres, of mowing, completed and accepted. The quantity will be determined by calculation using the lengths and widths based on the station to station dimensions shown in the plans.~~

The quantity to be paid will be the project area shown in the Contract Documents, in acres, for each litter removal or mowing cycle completed and accepted. No adjustments will be made to the project area quantity.

**107-4 Basis of Payment.**

~~For litter removal, price~~ Price and payment will be full compensation for all work specified in this section.

~~For mowing, price and payment will be full compensation for all work specified in this section.~~

~~No separate payment will be made for litter removal and mowing after final acceptance. Payment will be made under:~~

- Item No. 107 - 1- Litter Removal - per acre.
- Item No. 107 - 2- Mowing - per acre





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **110**  
Proposed Specification: **1100201 Clearing and Grubbing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the Construction Office to prevent conflict with 110 and 120-4.21 Standard clearing and grubbing includes the removal of asphalt and base, but in 120-4.2 the removal of base is not always necessary.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CLEARING AND GRUBBING**  
**(REV 12-08-20)**

SUBARTICLE 110-2.1 is deleted and the following substituted:

**110-2.1 Work Included:** Completely remove and dispose of all buildings, timber, brush, trees, stumps, roots, rubbish, debris, existing flexible pavement and base, drainage structures, culverts, and pipes. Remove all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas.

Perform standard clearing and grubbing within the following areas:

1. All areas where excavation is to be done, including borrow pits, lateral ditches, right-of-way ditches, etc.
2. All areas where roadway embankments will be constructed. unless constructing over an existing road. If constructing over an existing road, remove asphalt and base in accordance with 120-4.2 and the Plans.
3. All areas where structures will be constructed, including pipe culverts and other pipe lines.



*Florida Department of Transportation*

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SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **120**  
Proposed Specification: **1200101 Excavation and Embankment.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the Construction Office to clearly define existing ground line and to clarify how the volume of excavation and embankment is calculated.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to <mailto:daniel.strickland@dot.state.fl.us>.

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## EXCAVATION AND EMBANKMENT (REV 1-26-21)

SUBARTICLE 120-1.1 is deleted and the following substituted:

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

Meet the requirements of Section 110 for excavation of material for clearing and grubbing and Section 125 for excavation and backfilling of structures and pipe. Material displaced by the storm sewer or drainage structure system is not included in the earthwork quantities shown in the Plans. The original ground line is defined as the contour of existing natural topography. The finished grading template is defined as the contour of the finished side slopes, unpaved shoulders, and the bottom of the roadway subbase and shoulder base for flexible or rigid pavement.

SUBARTICLE 120-2.2.1 is deleted and the following substituted:

**120-2.2.1 Roadway Excavation:** Roadway excavation consists of the excavation and the utilization or disposal of all materials necessary for the construction of the roadway, ditches, channel changes, etc., except for removal of existing pavement as defined in Section 110. ~~as may be specifically shown to be paid for separately and that portion of the lateral ditches within the limits of the roadway right of way as shown in the Plans.~~

SUBARTICLE 120-2.3 is deleted and the following substituted:

**120-2.3 Subsoil Excavation:** Subsoil excavation consists of the excavation and disposal of muck, clay, rock, or any other material that is unsuitable in its original position and that is excavated below the finished grading template. ~~For stabilized bases and sand bituminous road mixes, consider the finished grading template as the top of the finished base, shoulders and slopes. For all other bases and rigid pavement, consider the finished grading template as the finished shoulder and slope lines and bottom of completed base or rigid pavement.~~ For pond and ditches that identify the placement of a blanket material, consider the finished grading template as the bottom of the blanket material. Subsoil excavation also consists of the excavation of all suitable material within the above limits as necessary to excavate the unsuitable material. Consider the limits of subsoil excavation indicated in the Plans as being particularly variable, in accordance with the field conditions actually encountered.

The quantity of material required to replace the excavated material and to raise the elevation of the roadway to the bottom of the template will be paid for under embankment or borrow excavation (Truck Measure).

ARTICLE 120-4 is deleted and the following substituted:

**120-4 Removal of Unsuitable Materials and Existing Roads.**

**120-4.1 Subsoil Excavation:** Where muck, rock, clay, or other material within the limits of the roadway is unsuitable in its original position, excavate such material to the cross-sections shown in the Plans or indicated by the Engineer, and backfill with suitable material. Shape backfill material to the required cross-sections. Where the removal of plastic soils below the finished earthwork grade is required, meet a construction tolerance, from the lines shown in the Plans as the removal limits, of plus or minus 0.2 feet in depth and plus or minus 6 inches (each side) in width.

**120-4.2 Construction over Existing Old Road:** Where a new roadway is to be constructed over an old one, ~~plow or scarify the old road, and break it up full width, regardless of height of fill. If the Plans provide that paving materials may be incorporated into the fill, distribute such material in a manner so as not to create voids. Recompact the old road meeting the requirements of 120-10.2.~~ completely remove the existing pavement for the entire limits of the width and depth. Compact disturbed material in accordance with Section 120 or 160, whichever material applies. If indicated in the Plans, remove the existing base in accordance with Section 110-2.

~~**120-4.3 Obliterating Old Road:** Where the Plans call for obliteration of portions of an old road outside of the proposed new roadway, obliterate such sections of the old road by grading to fill ditches and to restore approximately the original contour of the ground or a contour which produces a pleasing appearance.~~

SUBARTICLE 120-8.2.3 is deleted and the following substituted:

**120-8.2.3 Placing on Steep Slopes:** When constructing an embankment on a hillside sloping more than 20 degrees from the horizontal, before starting the fill, deeply plow or cut steps into the surface of the ~~original ground~~ existing slope on which the embankment is to be placed.

SUBARTICLE 120-13.1 is deleted and the following substituted:

**120-13.1 General:** When payment for excavation is on a volumetric basis, the quantity to be paid for will be the volume, in cubic yards, ~~calculated by the method of average end areas, unless the Engineer determines that another method of calculation will provide a more accurate result.~~ The material will be measured in its original position by field survey or by photogrammetric means as designated by the Engineer, unless otherwise specified under the provisions for individual items.

Where subsoil excavation extends outside the lines shown in the Plans or authorized by the Engineer including allowable tolerances, and the space is backfilled with material obtained in additional authorized roadway or borrow excavation, the net fill, plus

shrinkage allowance, will be deducted from the quantity of roadway excavation or borrow excavation to be paid for, as applicable.

The quantity of all material washed, blown, or placed beyond the authorized roadway cross-section will be determined by the Engineer and will be deducted from the quantity of roadway excavation or borrow excavation to be paid for, as applicable.

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

SUBARTICLE 120-13.2 is deleted and the following substituted:

**120-13.2 Roadway Excavation:** The measurement will include only the net volume of material excavated between the original ground surface line or finished grading template of an existing roadbed, as applicable, and the finished grading template of new pavement surface of the completed earthwork, except that the measurement will also include all unavoidable slides which may occur in connection with excavation classified as roadway excavation.

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

SUBARTICLE 120-13.7 is deleted and the following substituted:

**120-13.7 Embankment:** The quantity will be at the plan quantity. Where payment for embankment is not to be included in the payment for the excavation, and is to be paid for on a cubic yard basis for the item of embankment, ~~the plan quantities to be paid for will be calculated by the method of average end areas unless the Engineer determines that another method of calculation will provide a more accurate result.~~ The measurement will include only material actually placed above the original ground line or the finished grading template of an existing roadbed, as applicable, within the lines and grades indicated in the Plans or directed by the Engineer. ~~The length used in the computations will be the station to station length actually constructed. The original ground line used in the computations will be as determined prior to placing of embankment subject to the provisions of 9-3.2, and no allowance will be made for subsidence of material below the surface of the original ground.~~ Where embankment is constructed over an existing road, the embankment measurement will include only the material actually placed above the existing base unless the Plans require the complete removal of the base. If both the asphalt and base is removed, the embankment measurement will include only the material actually placed above the finish grading template of the existing roadbed.

If there are authorized changes in plan dimensions or if errors in plan quantities are detected, plan quantity will be adjusted as provided in 9-3.2.

~~Where the work includes excavation of unsuitable material below the finished grading template or original ground line, whichever is lower as defined in 1203.3, the original ground line is defined as the surface prior to beginning excavation, except that this surface is not outside the permissible tolerance of lines and grades for subsoil excavation as indicated in the Plans or as directed by the Engineer.~~ Any overrun or underrun of plan quantity for subsoil excavation which results in a corresponding increase or decrease in embankment will be considered as an authorized plan change for adjustment purposes as defined in 9-3.2.2.

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

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



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **125**  
Proposed Specification: **1250501 Excavation for Structures and Pipe.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the Construction Office to update references to the original ground surface to match the definition of the original ground line in Section 120. The updates also include clarifying the method of measurement.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to mail to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## EXCAVATION FOR STRUCTURES AND PIPE (REV 11-10-20)

SUBARTICLE 125-5.1 is deleted and the following substituted:

**125-5.1 General:** Unless shown in the Plans, do not excavate outside of caissons, cribs, cofferdams, or sheet piling, and do not disturb the natural stream bed adjacent to the structure. If excavating or dredging at the site of the structure before sinking caissons, cribs, or cofferdams, complete the foundation and backfill all such excavations to the original ground surfaceline or other required elevation, with material satisfactory to the Engineer.

SUBARTICLE 125-8.1.3 is deleted and the following substituted:

**125-8.1.3 Backfill Materials:** Backfill to the original ground surfaceline or subgrade surface of openings made for structures, with a sufficient allowance for settlement. The Engineer may require that the material used for this backfill be obtained from a source entirely apart from the structure. Use only material accepted by the Engineer. Maintain a clearance of at least 1 foot of clean select soil between recycled concrete aggregate (RCA) and aluminum or metalized drainage pipe.

Do not allow heavy construction equipment to cross over culvert or storm sewer pipes until placing and compacting backfill material to the finished earthwork grade or to an elevation at least 4 feet above the crown of the pipe.

ARTICLE 125-12 is deleted and the following substituted:

### **125-12 Cleaning Up.**

Upon completion of the work, leave the structure and all adjacent areas in a neat and presentable condition, clear up all temporary structures, rubbish and surplus materials and leave the space under the structure unobstructed and in such shape that drift will not collect nor scour or be induced. Pile all material from existing structures that have been removed neatly on the bank, unless otherwise directed by the Engineer. Pull false work piling unless the Engineer permits it to be cut or broken off in which case it will be cut or broken off at least 2 feet below the groundlinefinished grade or stream bed.

ARTICLE 125-13 is deleted and the following substituted:

### **125-13 Method of Measurement.**

When direct payment for excavation for structures is provided in the proposal, and such payment is on a unit basis, ~~such excavation will be measured in its original position by the cross-~~

~~section calculation method or surface to surface calculation method to determine the amount of material. The cubic yard volume of excavation used as a~~ the basis of payment is the cubic yard volume of ~~will then be that~~ the material ~~actually removed~~ excavated below the original ground line or stream bed, but not including that shown in the Plans to be paid for either as regular excavation, subsoil excavation, lateral ditch excavation or channel excavation, or which is included in the item for grading, and except that no payment will be made for material removed in excavating for footings or foundations outside of an area which is bounded by vertical planes 12 inches outside of the limits of the footing and parallel thereto. For pipe trenches the width used to be in the calculation shall be the diameter of the pipe, plus 24 inches.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 7, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **125**  
Proposed Specification: **1250801 Excavation for Structures and Pipe.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to replace references to the Density Log with the Department's database.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**EXCAVATION FOR STRUCTURES AND PIPE  
(REV 11-06-20)**

SUBARTICLE 125-8.1.6.1 is deleted and the following substituted:

**125-8.1.6.1 Thick Lift Requirements:** The Contractor may elect to place material in thicker lifts of no more than 12 inches compacted thickness above the Soil Envelope if the embankment material is classified as Group 1 in the table below. If the embankment material is classified as Group 2 in the table below and the Contractor chooses to place material in thicker lifts of no more than 12 inches compacted thickness above the soil envelope then the Contractor must demonstrate with a successful test section that density can be achieved. Thick lift around structures is only allowed above the soil envelope of the connecting pipe. Notify the Engineer in writing prior to beginning construction of a test section. Construct a test section of the length of one LOT. Perform five quality control (QC) tests at random locations within the test section. All five tests must meet the density required by 125-9.2 and be verified by the Department. Identify the test section with the compaction effort and soil classification in the [Log Book Earthwork Records System \(ERS\) section of the Department's database](#). In case of a change in compaction effort or soil classification, construct a new test section. When a QC test fails the requirements of 125-9.2 or when the QC tests cannot be verified, construct a new test section. The Contractor may elect to place material in 6 inches compacted thickness at any time.

Group	AASHTO Soil Class	Maximum Lift Thickness		Thick Lift Control Test Section Requirements	
		Within Cover Zone	Above Soil Envelope	Within Cover Zone	Above Soil Envelope
1	A-3	6 inches	12 inches	N/A	Not Needed
	A-2-4 (No. 200 Sieve $\leq$ 15%)				
2	A-1	6 inches without control test section	N/A	Maximum of 12 inches per 120-8.2.1.2	
	A-2-4 (No. 200 Sieve $>$ 15%)				
	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6				
	A-7 (Liquid Limit $<$ 50)				

SUBARTICLE 125-9.1 is deleted and the following substituted:

**125-9.1 General Requirements:** Meet the requirements of 120-10, except replace the requirements of 120-10.1.6 with 125-9.1.1, 120-10.2 with 125-9.2, and 120-10.3 with 125-9.3.

**125-9.1.1 Reduced Testing Frequency:** Obtain the Engineer's approval in writing for the option to reduce density testing frequency to one test every two LOTs or one every four LOTs for trench box operations if the following requirements are met:

- a. Resolution testing was not required for six consecutive verified LOTs.

b. Resolution testing was required for any of the six consecutive verified LOTs, but QC test data was upheld.

Identify the substantiating tests in the ~~Density Log Book~~ ERS section of the Department's database and notify the Engineer in writing prior to starting reduced frequency of testing. Generate random numbers for selecting test locations for the LOTs under consideration. When QC test frequency is reduced, obtain the Engineer's approval in writing to place more than one LOT over an untested LOT. Do not apply reduced testing frequency for the first and last lift of pipe. Assure similar compaction efforts for the untested sections. If the Verification test fails, and QC test data is not upheld by Resolution testing the QC testing will revert to the original frequency.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 7, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **145**  
Proposed Specification: **1450600 Geosynthetic Reinforcement.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to include updating the density log book on the Department's database.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GEOSYNTHETIC REINFORCEMENT  
(REV 11-06-20)**

ARTICLE 145-6 is deleted and the following substituted:

**145-6 Acceptance Program.**

**145-6.1 General Requirements:** Meet the requirements of 120-10 except delete the requirements of 120-10.1.4.1, 120-10.1.6, ~~and~~ 120-10.2 and 120-10.3.

**145-6.2 Maximum Density Determination:** Determine the maximum QC density in accordance with FM 1-T180, ~~Method D~~. When compacting A-3 or A-2-4 materials to meet the alternate acceptance criteria in 145-6.3.1.1, Ddetermine the maximum density in accordance with ~~AASHTO FM 1-T099, Method C~~. Perform gradation tests on the sample collected in accordance with AASHTO T27 and FM 1-T011.

**145-6.3 Density Testing Requirements:** Ensure compliance with the requirements of nuclear density testing in accordance with FM 1-T238. Determine the in-place moisture content for each density test. Use FM 5-507 (Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester), or FM 5-535 (Laboratory Determination of Moisture Content by Granular Soils by Use of a Microwave Oven) for moisture determination.

**145-6.3.1 Acceptance Criteria:** For select backfill, obtain a density in each LOT of at least 95% of the maximum density as determined by ~~AASHTO~~ FM 1-T180.

**145-6.3.1.1 Optional Acceptance Criteria for A-3 and A-2-4 Materials:** Obtain a minimum density of 100% of the maximum dry density as determined by ~~AASHTO~~ FM 1-T099. The combined width from both reinforced fill volume and retained fill material may be considered the same LOT if both volumes comprise the same material and both are compacted with the same procedure, lift thickness, equipment and compacting effort.

**145-6.4 Frequency:** Conduct sampling and testing at a minimum frequency listed in the table below. The Engineer will perform verification sampling and tests at a minimum frequency listed in the table below.

Table 145-2		
Test Name	Quality Control (QC)	Verification
Maximum Density	One per soil type	One per soil type
Density	One per LOT	One per four LOTs
Soil Classification, Gradation, LL & PI	One per Maximum Density	One per Maximum Density
Organic Content	One per soil type	One per soil type

In addition, test for pH at a minimum frequency of one test per soil type at point of placement according to 145-3. The Engineer will collect enough material to split and create two separate samples and retain one for resolution at point of placement until LOTs represented by the samples are accepted.

**145-6.5 Test Selection and Reporting:** Determine test locations including stations and offsets, using the random number generator approved by the Engineer. Do not use note-pads or work-sheets to record data for later transfer into the ~~density log book~~ Earthwork Records System

(ERS) section of the Department's database. Notify the Engineer upon successful completion of QC testing on each LOT.

SUBARTICLE 145-7.1 is deleted and the following substituted:

**145-7.1 Maximum Density Determination:** The Engineer will collect enough material to split and create two separate samples and retain one for resolution until LOTs represented by the samples are accepted. The Engineer will meet the requirements of 120-10.4.1 except replace ~~AASHTO FM 1-T099, Method C~~ with FM 1-T180, ~~Method D~~. If the Contractor selects the optional acceptance criteria, the Engineer will verify the QC results of ~~AASHTO FM 1-T099, Method C~~ in accordance with 120-10.4.1.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **160**  
Proposed Specification: **1600402 Stabilizing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to include updating the density log book on the Department's database.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STABILIZING**  
**(REV 11-06-20)**

SUBARTICLE 160-4.2 is deleted and the following substituted:

**160-4.2 Mixing Depth Requirements:** Report depth requirements in the Earthwork Records System (ERS) section of the Department's database measured to the nearest 0.25 inch. The difference between the individual measured depth thickness on the roadway and the plan target thickness must not exceed 2 inches. The difference between the LOT average (average of the three individual measured depth thickness) and the plan target thickness must not exceed 1 inch. No undertolerance of mixing depth is allowed.

As an exception to the above mixing requirements, where the subgrade is of rock, the Engineer may waive the mixing operations (and the work of stabilizing), and the Department will not pay for stabilization for such sections of the roadway.

Meet the required Plan mixing-depths by measuring from the proposed final grade line. Determine test locations, including stations and offsets, using the Random Number generator approved by the Department. Notify the Engineer a minimum of 24 hours before checking mixing depths. Record results on Department approved forms.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 14, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **200**  
Proposed Specification: **2000502 Rock Base.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to modify the density logbook to the Departments database.  
Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**ROCK BASE  
(REV 11-3-20)**

SUBARTICLE 200-5.2 is deleted and the following substituted:

**200-5.2 Number of Courses:** When the specified compacted thickness of the base is greater than 6 inches, construct the base in multiple courses of equal thickness. Individual courses shall not be less than 3 inches. The thickness of the first course may be increased to bear the weight of the construction equipment without disturbing the subgrade.

If, through field tests, the Contractor can demonstrate that the compaction equipment can achieve density for the full depth of a thicker lift, and if approved by the Engineer, the base may be constructed in successive courses of not more than 8 inches compacted thickness.

The Engineer will base approval on results of a test section constructed using the Contractor's specified compaction effort. Notify the Engineer prior to beginning construction of a test section. Construct a test section of the length of one LOT. Perform five QC density tests at random locations within the test section. At each test site, test the bottom 6 inches in addition to the entire course thickness. All QC tests and a Department Verification test must meet the density required by 200-7.2.1. Identify the test section with the compaction effort and thickness in the [Logbook Earthwork Records System \(ERS\) portion of the Department's database](#). Remove the materials above the bottom 6 inches, at no expense to the Department. The minimum density required on the thicker lift will be the average of the five results obtained on the thick lift in the passing test section. Maintain the exposed surface as close to "undisturbed" as possible; no further compaction will be permitted during the test preparation. If unable to achieve the required density, remove and replace or repair the test section to comply with the specifications at no additional expense to the Department. The Contractor may elect to place material in 6 inches compacted thickness at any time.

Once approved, a change in the source of base material will require the construction of a new test section. Do not change the compaction effort once the test section is approved. The Engineer will periodically verify the density of the bottom 6 inches during thick lift operations.

The Engineer may terminate the use of thick lift construction and instruct the Contractor to revert to the 6 inches maximum lift thickness if the Contractor fails to achieve satisfactory results or meet applicable specifications.

SUBARTICLE 200-7.2.1 is deleted and the following substituted:

**200-7.2 Acceptance Criteria:**

**200-7.2.1 Density:** Within the entire limits of the width and depth of the base, obtain a minimum density in any LOT of 98% of modified Proctor maximum density as determined by FM 1-T180, [Method D](#) or the Pit Proctor when using the Pit Proctor option. For shoulder only areas and shared use paths, obtain a minimum density of 95% of the modified Proctor maximum density as determined by FM 1-T180, [Method D](#) or the Pit Proctor when using the Pit Proctor option.

SUBARTICLE 200-7.2.3 is deleted and the following substituted:

**200-7.2.3 Pit Proctor:** In lieu of Modified Proctor Maximum Density testing at the roadway, notify the Engineer in writing that the Contractor option to use the Pit Proctor supplied by the Department will be used. The Modified Proctor maximum density frequency requirements of 200-7.2.2 shall not apply. The Department will determine the Pit Proctor from statistical analysis of the base rock Modified Proctor maximum density at Department approved mines. For posting of Mines and Pit Proctors for each calendar quarter refer to the [Pit Proctor Quarterly report located at the following URL:](#) ~~<https://www.fdot.gov/materials/laboratory/geotechnical/aggregates/pitproctor/index.shtm>~~ ~~State Materials Office internet website at <https://www.fdot.gov/materials/>~~. Use the current posted Pit Proctor value in lieu of the Modified Proctor maximum density required by 200-7.2.1. Use the current posted Pit Proctor value for density acceptance during the quarter corresponding to the posting. Notify the Engineer in writing if returning to the provisions of 200-7.2 and 200-7.2.2 but do not re-elect to use the Pit Proctor until the start of the next calendar quarter.

SUBARTICLE 200-7.3.1.3 is deleted and the following substituted:

**200-7.3.1.3 Surface & Thickness Reduced Testing Frequency:** When no Resolution testing is required for 12 consecutive verified LOTs, or if required, the QC test data was upheld, reduce the QC surface and/or thickness checks to one half the minimum requirements as stated in 200-7.2.2 (e.g., reduce frequency from ten per LOT to ten per two LOTs) by identifying the substantiating tests and notifying the Engineer in writing prior to starting reduced frequency of testing. If the Verification test fails, and QC test data is not upheld by Resolution testing the QC testing will revert to the original frequency of 200-7.2.2. The results of the Independent Verification testing will not affect the frequency of the QC testing. [Do not apply reduced testing frequency in construction of shoulder-only areas, shared use paths, and sidewalks.](#)

SUBARTICLE 200-7.3.2.1 is deleted and the following substituted:

**200-7.3.2 Department Verification Tests:**

**200-7.3.2.1 Maximum Density:** The Engineer will randomly select one of the remaining two split samples and test in accordance with FM 1-T180, ~~Method D~~.

SUBARTICLE 200-7.4.1 is deleted and the following substituted:

**200-7.4 Verification Comparison Criteria and Resolution Procedures:**

**200-7.4.1 Modified Proctor Maximum Density:** The Engineer will compare the Verification test results of 200-7.3.2.1 to the corresponding QC test results. If the test result is within 4.5 lb/ft<sup>3</sup> of the QC test result, the LOTs will be verified. Otherwise, the Engineer will collect the Resolution split sample corresponding to the Verification sample tested. The State Materials Office or an AASHTO accredited laboratory designated by the State Materials Office

will perform Resolution testing. The material will be sampled and tested in accordance with FM 1-T180, ~~Method D~~.

The Engineer will compare the Resolution Test results with the QC test results. If the Resolution Test result is within  $4.5 \text{ lb/ft}^3$  of the corresponding QC test result, the Engineer will use the QC test results for material acceptance purposes for each corresponding set of LOTs. If the Resolution test result is not within  $4.5 \text{ lb/ft}^3$  of the corresponding QC test, the Engineer will collect the remaining Verification split sample for testing. Verification Test results will be used for material acceptance purposes for the LOTs in question.

SUBARTICLE 200-7.4.2 is deleted and the following substituted:

**200-7.4.2 Pit Proctor:** When using the Pit Proctor option, the Engineer will select a random location to sample and test at the minimum frequency in the table below, to obtain an Independent Verification (IV) maximum density as determined by FM 1-T180, ~~Method D~~. The Engineer will collect enough material to split and hold a sample for Resolution testing.

Test Name	Mainline Pavement Lanes, Turn Lanes, Ramps, Parking Lots, Concrete Box Culverts and Retaining Wall Systems	Shoulder-Only, Shared Use Path and Sidewalk Construction
IV Modified Proctor Maximum Density	One per 16 consecutive LOTs	One per 4 consecutive LOTs

The Engineer will compare the IV results with the Pit Proctor. If the IV result is lower than or equal to the Pit Proctor plus  $4.5 \text{ pcf}$ , keep the option to use the Pit Proctor. If the IV result is more than  $4.5 \text{ pcf}$  higher than the Pit Proctor the Engineer will test the Resolution sample and compare the Resolution result with the Pit Proctor. If the Resolution result is lower than or equal to the Pit Proctor plus  $4.5 \text{ pcf}$ , keep the option to use the Pit Proctor. Otherwise return to the provisions of 200-7.2.2, 200-7.3.1.1, 200-7.3.2.1, and 200-7.4.1.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 14, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **234**  
Proposed Specification: **2340701 Superpave Asphalt Base.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko from the State Materials Office to modify subarticle 234-7.1.3 as it conflicted with 234-8.1.1.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SUPERPAVE ASPHALT BASE**  
**(REV 11-2-20)**

SUBARTICLE 234-7.1.3 is deleted and the following substituted:

**234-7 Construction Requirements.**

**234-7.1 General:** Meet the general construction requirements of Section 330, with the following modifications:

**234-7.1.1 Temperature Limitations:** Spread the mixture only when the air temperature is at least 40°F. Do not place the material on frozen subgrade.

**234-7.1.2 Tack Coat:** Unless otherwise authorized by the Engineer, apply a tack coat between successive layers of base material.

**234-7.1.3 Thickness of Layers:** Construct each course in layers, ~~not to exceed 3 inches compacted thickness~~ such that the compacted thickness is in compliance with the layer thicknesses in 234-8.1.1 and spread rate tolerance in 234-8.2.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **327**  
Proposed Specification: **3270301 MILLING OF EXISTING ASPHALT  
PAVEMENT.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt to allow milled surfaces to be open to traffic for up to 3 days provided the Contractor meets milled surface requirements in the Standard Specification. Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## MILLING OF EXISTING ASPHALT PAVEMENT

(REV ~~10-27~~12-9-20)

SUBARTICLE 327-3.1 is deleted and the following replaced:

327-3 Construction.

**327-3.1 General:** Remove the existing raised pavement markers (RPMs) before milling. Include the cost of removing existing RPMs in the price for milling.

When milling to improve rideability or cross slope, remove the existing pavement to the average depth specified in the Plans, in a manner that will restore the pavement surface to a uniform cross-section and longitudinal profile. The Engineer may require the use of a stringline to ensure maintaining the proper alignment.

Establish the longitudinal profile of the milled surface in accordance with the milling plans. Ensure the final cross slope of the milled surface parallels the surface cross slope shown in the Plans or as directed by the Engineer. Establish the cross slope of the milled surface by a second sensing device near the outside edge of the cut or by an automatic cross slope control mechanism. The Plans may waive the requirement of automatic grade or cross slope controls where the situation warrants such action.

Operate the milling machine to minimize the amount of dust being emitted. The Engineer may require prewetting of the pavement.

Provide positive drainage of the milled surface and the adjacent pavement. Perform this operation on the same day as milling. ~~Rep~~Pave all milled surfaces no later than the day after the surface was milled.

If traffic is to be maintained on the milled surface before the placement of the new asphalt concrete, provide suitable transitions between areas of varying thickness to create a smooth longitudinal riding surface. ~~Produce a pattern of striations that will provide an acceptable riding surface.~~ Control milling operations to produce a pattern of striations and a texture that ~~will~~ provide an acceptable riding surface.

Before opening an area which has been milled to traffic, sweep the pavement and gutters with a power broom or other approved equipment to remove, to the greatest extent practicable, fine material which will create dust under traffic. Sweep in a manner to minimize the potential for creation of a traffic hazard and to minimize air pollution. Do not sweep or allow milled asphalt into inlets.

Sweep the milled surface with a power broom before placing asphalt concrete.

In urban and other sensitive areas, use a street sweeper or other equipment capable of removing excess milled materials and controlling dust. Obtain the Engineer's approval of such equipment, contingent upon its demonstrated ability to do the work.

Perform the sweeping operation immediately after the milling operations or as directed by the Engineer.

**327-3.1.1 Extended Time for Milled Surface Traffic:** Upon approval of the Engineer, the time period for maintaining traffic on a milled surface may be extended up to 3 calendar days before paving is required, provided the Contractor can demonstrate the ability to produce a milled surface texture with continuous, longitudinal milling striations with no gaps in the longitudinal striations, and drop off conditions are not exceeded. Gaps in the milling striations and cases where gaps create a diagonal pattern or chevron appearance are to be milled again such that continuous, longitudinal striations are achieved prior to allowing traffic on the milled surface. Photos of acceptable and unacceptable surface texture are located at:

<https://www.fdot.gov/programmanagement/implemented/urlinspecs/milling-patterns>

Maintain adequate drainage on the milled surface and at transitions between milled and non-milled surfaces on the same day as milling. At no cost to the Department, re-mill or pave any area the Engineer determines to have an unacceptable ride, does not provide adequate pavement structure, or does not provide adequate drainage.

If the Engineer determines the Contractor is unable to provide a milled surface meeting the Specification requirements above, at no cost to the Department, the Contractor will be required to pave all milled surfaces no later than the day after the surface was milled.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 7, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **330**  
Proposed Specification: **3300904 HOT MIX ASPHALT - GENERAL  
CONSTRUCTION REQUIREMENTS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt from the State Construction Office to add speed tables and raised crosswalks to the straightedge testing exception areas in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HOT MIX ASPHALT - GENERAL CONSTRUCTION REQUIREMENTS  
(REV 10-5-20)**

SUBARTICLE 330-9.4.5.2 is deleted and the following substituted:

**330-9.4.5.2 Straightedge Exceptions:** Straightedge testing will not be required in the following areas: shoulders, intersections, tapers, crossovers, sidewalks, shared use paths, parking lots, raised crosswalks, speed tables, and similar areas, or in the following areas when they are less than 250 feet in length: turn lanes, acceleration/deceleration lanes and side streets. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets.

As an exception, in the event the Engineer identifies an objectionable surface irregularity in the above areas, straightedge and address all deficiencies in excess of 3/8 inch in accordance with 330-9.5.

The Engineer may waive straightedge requirements for transverse joints at the beginning and end of the project, at the beginning and end of bridge structures, at manholes, and at utility structures if the deficiencies are caused by factors beyond the control of the Contractor, as determined by the Engineer. In addition, the Engineer may also waive the straightedging requirements on ramps and superelevated sections where the geometrical orientation of the pavement results in an inaccurate measurement with the rolling straightedge.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **334**  
Proposed Specification: **3340501 SUPERPAVE ASPHALT CONCRETE.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko from the State Materials Office to update language, raise upper density limits in Tables 334-8 and 334-9, and delete sample sizes n-5 and n-6 in Table 334-10, in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SUPERPAVE ASPHALT CONCRETE**  
**(REV 10-28-20)**

SUBARTICLE 334-5.1.2 is deleted and the following substituted:

**334-5.1.2 Acceptance Testing Exceptions:** When the total combined quantity of hot mix asphalt for the project, as indicated in the Plans for Type B-12.5, Type SP and Type FC mixtures only, is less than 2000 tons, the Engineer will accept the mix on the basis of visual inspection. The Engineer may require the Contractor to run process control tests for informational purposes, as defined in 334-4, or may run independent verification tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, open-graded friction courses, variable thickness overbuild courses, leveling courses, any SP-9.5 or SP-12.5 asphalt layer placed on subgrade with a layer thickness less than or equal to 3 inches, miscellaneous asphalt pavement, shared use paths, crossovers, gore areas, raised crosswalks, speed tables, or any course with a specified thickness less than 1 inch or a specified spread rate that converts to less than 1 inch as described in 334-1.4. Density testing for acceptance will not be performed on asphalt courses placed on bridge decks or approach slabs; compact these courses in static mode only per the requirements of 330-7.7. In addition, density testing for acceptance will not be performed on the following areas when they are less than 500 feet (continuous) in length: turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes, ~~or~~ ramps, or unsignalized side streets with less than four travel lanes and speed limits less than 35 mph. Do not perform density testing for acceptance in situations where the areas requiring density testing is less than 50 tons within a subplot.

Density testing for acceptance will not be performed in intersections. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets. A random core location that occurs within the intersection shall be moved forward or backward from the intersection at the direction of the Engineer.

Where density testing for acceptance is not required, compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure (equipment and pattern) as approved by the Engineer or with Standard Rolling Procedure as specified in 330-7.2. In the event that the rolling procedure deviates from the procedure approved by the Engineer, or the Standard Rolling Procedure, placement of the mix shall be stopped.

The density pay factor (as defined in 334-8.2) for areas not requiring density testing for acceptance will be paid at the same density pay factor as for the areas requiring density testing within the same LOT. If the entire LOT does not require density testing for acceptance, the LOT will be paid at a density pay factor of 1.00.

SUBARTICLE 334-8.2.2 is deleted and the following substituted:

**334-8.2.2 Two or Less Sublot Test Results:** In the event that two or less subplot test results are available for a LOT, Pay Factors will be determined based on Table 334-8, using the average of the accumulated deviations from the target value. (Except for density, deviations

are absolute values with no plus or minus signs.) Use the 1-Test column when there is only one subplot test result and use the 2-Tests column when there are two subplots.

Table 334-8 Small Quantity Pay Table		
Pay Factor	1 Sublot Test Deviation	2 Sublot Test Average Deviation
Asphalt Binder Content		
1.05	0.00-0.23	0.00-0.16
1.00	0.24-0.45	0.17-0.32
0.90	0.46-0.55	0.33-0.39
0.80	>0.55	>0.39
No. 8 Sieve		
1.05	0.00-2.25	0.00-1.59
1.00	2.26-4.50	1.60-3.18
0.90	4.51-5.50	3.19-3.89
0.80	>5.50	>3.89
No. 200 Sieve		
1.05	0.00-0.55	0.00-0.39
1.00	0.56-1.10	0.40-0.78
0.90	1.11-1.50	0.79-1.06
0.80	>1.50	>1.06
Air Voids		
1.05	0.00-0.50	0.00-0.35
1.00	0.51-1.00	0.36-0.71
0.90	1.01-1.70	0.72-1.20
0.80	1.71-2.00	1.21-1.41
0.70	2.01-2.50	1.42-1.77
0.55	>2.50	>1.77
Density <sup>(1)</sup> Target = 93.00 percent of G <sub>mm</sub>		
1.05	+ (0.00- <del>2.03.50</del> ), - (0.00-0.50)	+ (0.00- <del>1.403.25</del> ), - (0.00-0.35)
1.00	+ ( <del>2.03.51-3.04.50</del> ), - (0.51-1.00)	+ ( <del>1.413.26-2.104.25</del> ), - (0.36-0.71)
0.95	+ ( <del>3.04.51-3.55.00</del> ), - (1.01-2.00)	+ ( <del>2.114.26-2.804.75</del> ), - (0.72-1.41)
0.90	+ ( <del>3.5.01-45.050</del> ), - (2.01-3.00)	+ ( <del>2.814.76-35.250</del> ) - (1.42-2.12)
0.80	+ (> <del>45.050</del> ), - (>3.00)	+ (> <del>35.250</del> ), - (>2.12)
Density <sup>(1)</sup> Target = 92.00 percent of G <sub>mm</sub>		
<u>1.05</u>	<u>+ (0.00-4.50), - (0.00-0.50)</u>	<u>+ (0.00-4.25), - (0.00-0.35)</u>
<u>1.00</u>	<u>+ (4.51-5.50), - (0.51-1.00)</u>	<u>+ (4.26-5.25), - (0.36-0.71)</u>
<u>0.95</u>	<u>+ (5.51-6.00), - (1.01-1.50)</u>	<u>+ (5.26-5.75), - (0.72-1.41)</u>
<u>0.90</u>	<u>+ (6.01-6.50), - (1.51-2.00)</u>	<u>+ (5.76-6.25) - (1.42-2.12)</u>
<u>0.80</u>	<u>+ (&gt;6.50), - (&gt;2.00)</u>	<u>+ (&gt;6.25), - (&gt;2.12)</u>
<p>(1). Each density test result is the average of three to five randomly located cores. The target density is 93.00 percent of G<sub>mm</sub> (92.00 percent when compaction is limited to the static mode or for layers specified to be one inch thick). When compaction is limited to the static mode, no vibratory mode in the vertical direction will be allowed. Other vibratory modes will be allowed, if approved by the Engineer. In this case, the target density is 92.00 percent of G<sub>mm</sub>.</p>		



SUBARTICLE 334-8.2.3.1 is deleted and the following substituted:

**334-8.2.3.1 Percent Within Limits:** The percent within limits (PWL) and Pay Factors for the LOT will be calculated as described below. Variables used in the calculations are as follows:

x	= individual test value (sublot)
n	= number of tests (sublots)
s	= sample standard deviation
$\Sigma(x^2)$	= summation of squares of individual test values
$(\Sigma x)^2$	= summation of individual test values squared
$Q_U$	= upper quality index
USL	= upper specification limit (target value plus upper specification limit from Table 334-9)
$Q_L$	= lower quality index
LSL	= lower specification limit (target value minus lower specification limit from Table 334-9)
$P_U$	= estimated percentage below the USL
$P_L$	= estimated percentage above the LSL

1. Calculate the arithmetic mean ( $\bar{X}$ ) of the test values:

$$\bar{X} = \frac{\sum x}{n}$$

2. Calculate the sample standard deviation (s):

$$s = \sqrt{\frac{n \sum (x^2) - (\sum x)^2}{n(n-1)}}$$

3. Calculate the upper quality index ( $Q_U$ ):

$$Q_U = \frac{USL - \bar{X}}{s}$$

4. Calculate the lower quality index ( $Q_L$ ):

$$Q_L = \frac{\bar{X} - LSL}{s}$$

5. From Table 334-10, determine the percentage of work below the USL ( $P_U$ ).

6. From Table 334-10, determine percentage of work above the LSL ( $P_L$ ) Note: If USL or LSL is not specified; percentages within (USL or LSL) will be 100.

7. If  $Q_U$  or  $Q_L$  is a negative number, then calculate the percent within limits for  $Q_U$  or  $Q_L$  as follows: enter Table 334-10 with the positive value of  $Q_U$  or  $Q_L$  and obtain the corresponding percent within limits for the proper sample size. Subtract this number from 100.00. The resulting number is the value to be used in the next step (Step 8) for the calculation of quality level.

8. Calculate the percent within limits ( $PWL$ ) = ( $P_U + P_L$ ) - 100

9. Calculate the Pay Factor (PF) for each quality characteristic using the equation given in 334-8.2.3.2.

Quality Characteristic	Specification Limits
Passing No. 8 sieve (percent)	Target $\pm$ 3.1
Passing No. 200 sieve (percent)	Target $\pm$ 1.0
Asphalt Content (percent)	Target $\pm$ 0.40
Air Voids (percent)	4.00 $\pm$ 1.20
Density, vibratory mode (percent of $G_{mm}$ ):	93.00 + <del>3</del> 4.00, - 1.20
Density, static mode (percent of $G_{mm}$ ):	92.00 + <del>4</del> 5.00, - 1.50 <sup>(1)</sup>

(1): No vibratory mode in the vertical direction will be allowed. Other vibratory modes will be allowed, if approved by the Engineer.

Quality Index	Percent within Limits for Selected Sample Size			
	n = 3	n = 4	<del>n = 5</del>	<del>n = 6</del>
0.00	50.00	50.00	<del>50.00</del>	<del>50.00</del>
0.05	51.38	51.67	<del>51.78</del>	<del>51.84</del>
0.10	52.76	53.33	<del>53.56</del>	<del>53.67</del>
0.15	54.15	55.00	<del>55.33</del>	<del>55.50</del>
0.20	55.54	56.67	<del>57.10</del>	<del>57.32</del>
0.25	56.95	58.33	<del>58.87</del>	<del>59.14</del>
0.30	58.37	60.00	<del>60.63</del>	<del>60.94</del>
0.35	59.80	61.67	<del>62.38</del>	<del>62.73</del>
0.40	61.26	63.33	<del>64.12</del>	<del>64.51</del>
0.45	62.74	65.00	<del>65.84</del>	<del>66.27</del>
0.50	64.25	66.67	<del>67.56</del>	<del>68.00</del>
0.55	65.80	68.33	<del>69.26</del>	<del>69.72</del>
0.60	67.39	70.00	<del>70.95</del>	<del>71.41</del>
0.65	69.03	71.67	<del>72.61</del>	<del>73.08</del>
0.70	70.73	73.33	<del>74.26</del>	<del>74.71</del>
0.75	72.50	75.00	<del>75.89</del>	<del>76.32</del>

Table 334-10 Percent Within Limits				
Quality Index	Percent within Limits for Selected Sample Size			
	n = 3	n = 4	<del>n = 5</del>	<del>n = 6</del>
0.80	74.36	76.67	<del>77.49</del>	<del>77.89</del>
0.85	76.33	78.33	<del>79.07</del>	<del>79.43</del>
0.90	78.45	80.00	<del>80.62</del>	<del>80.93</del>
0.95	80.75	81.67	<del>82.14</del>	<del>82.39</del>
1.00	83.33	83.33	<del>83.64</del>	<del>83.80</del>
1.05	86.34	85.00	<del>85.09</del>	<del>85.18</del>
1.10	90.16	86.67	<del>86.52</del>	<del>86.50</del>
1.15	97.13	88.33	<del>87.90</del>	<del>87.78</del>
1.20	100.00	90.00	<del>89.24</del>	<del>89.01</del>
1.25	100.00	91.67	<del>90.54</del>	<del>90.19</del>
1.30	100.00	93.33	<del>91.79</del>	<del>91.31</del>
1.35	100.00	95.00	<del>92.98</del>	<del>92.37</del>
1.40	100.00	96.67	<del>94.12</del>	<del>93.37</del>
1.45	100.00	98.33	<del>95.19</del>	<del>94.32</del>
1.50	100.00	100.00	<del>96.20</del>	<del>95.19</del>
1.55	100.00	100.00	<del>97.13</del>	<del>96.00</del>
1.60	100.00	100.00	<del>97.97</del>	<del>96.75</del>
1.65	100.00	100.00	<del>98.72</del>	<del>97.42</del>
1.70	100.00	100.00	<del>99.34</del>	<del>98.02</del>
1.75	100.00	100.00	<del>99.81</del>	<del>98.55</del>
1.80	100.00	100.00	<del>100.00</del>	<del>98.99</del>
1.85	100.00	100.00	<del>100.00</del>	<del>99.36</del>
1.90	100.00	100.00	<del>100.00</del>	<del>99.65</del>
1.95	100.00	100.00	<del>100.00</del>	<del>99.85</del>
2.00	100.00	100.00	<del>100.00</del>	<del>99.97</del>
2.05	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.10	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.15	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.20	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.25	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.30	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.35	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.40	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.45	100.00	100.00	<del>100.00</del>	<del>100.00</del>

Table 334-10 Percent Within Limits				
Quality Index	Percent within Limits for Selected Sample Size			
	n = 3	n = 4	<del>n = 5</del>	<del>n = 6</del>
2.50	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.55	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.60	100.00	100.00	<del>100.00</del>	<del>100.00</del>
2.65	100.00	100.00	<del>100.00</del>	<del>100.00</del>



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **337**  
Proposed Specification: **3370302 ASPHALT CONCRETE FRICTION COURSES.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko from the State Materials Office to update language to increase hydrated lime and add liquid anti-strip to FC-5 in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**ASPHALT CONCRETE FRICTION COURSES  
(REV 10-28-20)**

SUBARTICLE 337-3.2.1.3 is deleted and the following substituted:

**337-3.2.1.3 Hydrated Lime:** Add the lime at a dosage rate of 1.0% by weight of the total dry aggregate to mixes containing granite or granitic gneiss from Georgia or Alabama. Add the lime at a dosage of 1.5% by weight of the total dry aggregate to mixes containing any amount of granite from Nova Scotia.

SUBARTICLE 337-3.2.1.4 is deleted and the following substituted:

**337-3.2.1.4 Liquid Anti-Strip Additive:** Use a liquid anti-strip additive at the approved dosage rate as indicated on the APL for all mixtures ~~containing limestone aggregate.~~

ARTICLE 337-11 is deleted and the following substituted:

**337-11 Method of Measurement.**

For the work specified under this Section (including the pertinent provisions of Sections 320 and 330), the quantity to be paid for will be the weight of the mixture, in tons. For each pay item, the pay quantity will be based on the quantity placed on the project, limited to 105% of the adjusted plan quantity for the pay item. For dense-graded mixes, the adjusted plan quantity will be determined by dividing the pay item's original plan quantity (including any Engineer approved quantity revisions) by the design  $G_{mm}$  stated in 334--1.4, then multiplying it by the tonnage-weighted average  $G_{mm}$  of the mixes used for the pay item. For open graded mixes, the adjusted plan quantity will be determined by dividing the pay item's original plan quantity (including any Engineer approved quantity revisions) by the design  $G_{sb}$  stated in 337--8.2, then multiplying it by the tonnage-weighted average  $G_{sb}$  of the mixes used for the pay item.

The bid price for the asphalt mix will include the cost of the asphalt binder (asphalt rubber (or polymer), asphalt cement, ground tire rubber, anti-stripping ~~agent~~additive, blending and handling) and the tack coat application as directed in 300-8, as well as fiber stabilizing additive and hydrated lime (if required). There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix. The weight will be determined as provided in 320--3.2 (including the provisions for the automatic recordation system).

Prepare and submit a Certification of Quantities to the Engineer in accordance with 9--2.1.2.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

March 8, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **346**  
Proposed Specification: **REVISED 3460304 STRUCTURAL PORTLAND CEMENT  
CONCRETE.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jose Armenteros from the State Materials Office to clarify language in Table 346-4, add colored concrete, modify maximum allowable transit time, and simplify language in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STRUCTURAL PORTLAND CEMENT CONCRETE**(REV ~~10-2612-3-203-8-21~~)

SUBARTICLE 346-3.4.1 is deleted and the following substituted:

**346-3.4 Durability for Concrete Construction:**

**346-3.4.1 Minimum Cementitious Materials Content:** Ensure that the produced concrete meets the minimum amount of cementitious materials content in Table 346-4.

Table 346-4 Minimum Amount of Total Cementitious Materials Content (pounds per cubic yard of concrete)			
Concrete <del>Application</del> Class	Environmental Classification		
	Extremely Aggressive	Moderately Aggressive	Slightly Aggressive
<del>I, I (Pavement), II, and III (Seal)</del>	<del>470</del>		
<del>II (Bridge Deck), III, IV, IV (Drilled Shaft), V, V(Special), VI and VII Reinforced Concrete<sup>(4)</sup></del>	600	550	510
<del>Non-reinforced Concrete</del>	<del>470</del>		

Notes:  
~~(1) The Engineer may allow a lower total amount of cementitious materials content in concrete Class I, Class I (Pavement), Class II and Class III.~~

SUBARTICLE 346-6.4 is deleted and the following substituted:

**346-6.4 Plastic Property Tolerances:** Reject concrete with slump or air content that does not fall within the specified tolerances, except as noted below, and immediately notify the concrete production facility that an adjustment of the concrete mixture is required. If a load does not fall within the tolerances, test each subsequent load and the first adjusted load. If failing concrete is not rejected or adjustments are not implemented, the Engineer may reject the concrete and terminate further production until the corrections are implemented.

~~Do not allow concrete to remain in a transporting vehicle to reduce slump. Water may be added only upon arrival of the concrete to the jobsite and not thereafter.~~

At the Contractor's risk, water may be added at the placement site immediately after completion of the initial slump test, either to correct a low slump or to increase the concrete workability, provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design.

After adding water, perform an additional slump test to confirm the concrete is within the slump tolerance range. If the slump is outside the tolerance range, reject the load. If an adjustment is made at the concrete production facility, perform a slump test on the next load to ensure the concrete is within the slump tolerance range. Do not place concrete represented by slump test results outside of the tolerance range. Include water missing from the water storage tanks upon arrival at the project site in the jobsite water added.



Do not allow concrete to remain in a transporting vehicle to reduce slump.

SUBARTICLE 346-7.2 is deleted and the following substituted:

**346-7.2 Transit Truck Mixing:** Produce a completely uniform mixed concrete in a truck mixer for 70 to 100 revolutions at the mixing speed designated by the truck manufacturer.

Prior to starting the discharge of the concrete at the jobsite, when water is added, record the added quantity, and mix the concrete 30 additional drum mixing revolutions. Do not make more than two mix adjustments. Seek approval from the Engineer prior to using a central mixer and depositing the batch into a truck mixer.

**346-7.2.1 Transit Time:** Ensure compliance with Table 346-8 between the initial introduction of water into the mix and completely discharging all the concrete from the truck. Reject concrete exceeding the maximum transit time. For critical placements, with the Engineer's approval, an extension of, the transit time which will be identified on the approved mix design.

Table 346-8	
Maximum Allowable Transit Time	
Non-Agitator Trucks	Agitator Trucks
45 minutes	60 minutes
75 minutes <sup>(1)</sup>	90 minutes <sup>(1)</sup>

Note:  
(1) When a water-reducing and retarding admixture (Type D, Type G, or Type II) is used.

**346-7.2.2 Placement Time:** All the concrete in a load must be in its final placement position a maximum of 15 minutes after the transit time has expired unless a time extension is approved by the Engineer.

For Class IV (Drilled Shaft) mixes, placement time may be extended provided the slump loss time of the first concrete placed is not exceeded throughout the elapsed time.

The Engineer may perform Independent Verification (IV) testing to verify the plastic and hardened properties of the concrete when a time extension is granted.

SUBARTICLE 346-7.6 is deleted and the following substituted:

**346-7.6 Adding Water to Concrete at the Placement Site:** ~~Water may be added at the placement site provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design. After adding water, perform a slump test to confirm the concrete is within the slump tolerance range. If the slump is outside the tolerance range, reject the load. If an adjustment is made at the concrete production facility, perform a slump test on the next load to ensure the concrete is within the slump tolerance range. Do not place concrete represented by slump test results outside of the tolerance range. Include water missing from the water storage tanks upon arrival at the project site in the jobsite water added.~~ **Sample Location:** Obtain acceptance samples from the point of final placement.

Where concrete buckets are used to discharge concrete directly to the point of final placement or into the hopper of a tremie pipe, samples will be obtained from the discharge of the bucket. When the concrete is discharged directly from the mixer into the bucket and the bucket is discharged within 20 minutes, samples may be obtained from the discharge of the mixer.

Where conveyor belts, troughs, pumps, or chutes are used to transport concrete directly to the point of final placement or into the hopper of a tremie pipe, samples will be obtained from the discharge end of the entire conveyor belt, trough, pump, or chute system.

Where concrete is placed in a drilled shaft or other element using a tremie pipe and a concrete pump, samples will be obtained from the discharge of the pump line at the location of the tremie hopper.

For all other placement methods, prior to each placement, obtain Department approval for sampling at the discharge of the mixer in lieu of sampling at the point of final placement. Submit the sampling correlation procedure to the Engineer for approval prior to the placement of the concrete. Once the comparative sampling correlation is approved by the Engineer, apply this correlation to the plastic properties tolerances for samples obtained from the discharge of mixer.

Where a concrete pump is used to deposit concrete directly into a drilled shaft which is a wet excavation without the use of a tremie, or other applications as approved by the Engineer, ensure the discharge end of the pump line remains immersed in the concrete at all times after starting concrete placement.

SUBARTICLE 346-7-7 is deleted.

~~346-7.7 Sample Location: Obtain acceptance samples from the point of final placement.~~

~~Where concrete buckets are used to discharge concrete directly to the point of final placement or into the hopper of a tremie pipe, samples will be obtained from the discharge of the bucket. When the concrete is discharged directly from the mixer into the bucket and the bucket is discharged within 20 minutes, samples may be obtained from the discharge of the mixer.~~

~~Where conveyor belts, troughs, pumps, or chutes are used to transport concrete directly to the point of final placement or into the hopper of a tremie pipe, samples will be obtained from the discharge end of the entire conveyor belt, trough, pump, or chute system.~~

~~Where concrete is placed in a drilled shaft or other element using a tremie pipe and a concrete pump, samples will be obtained from the discharge of the pump line at the location of the tremie hopper.~~

~~For all other placement methods, prior to each placement, obtain Department approval for sampling at the discharge of the mixer in lieu of sampling at the point of final placement. Submit the sampling correlation procedure to the Engineer for approval prior to the placement of the concrete. Once the comparative sampling correlation is approved by the Engineer, apply this correlation to the plastic properties tolerances for samples obtained from the discharge of mixer.~~

~~Where a concrete pump is used to deposit concrete directly into a drilled shaft which is a wet excavation without the use of a tremie, or other applications as approved by the Engineer, ensure the discharge end of the pump line remains immersed in the concrete at all times after starting concrete placement.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **350**  
Proposed Specification: **3502002 CEMENT CONCRETE PAVEMENT.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the State Estimates Office to clarify no separate payment for curb joints in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CEMENT CONCRETE PAVEMENT**  
**(REV 11-3-20)**

SUBARTICLE 350-20.2 is deleted and the following substituted:

**350-20.2 Joints and Cracks:** For cleaning and sealing joints in new or existing concrete pavement, the quantity to be paid will be the length in feet, as determined by field measurement along the joints. Payment for the joints between concrete pavement and curb will be made under Section 520.

For cleaning and sealing random cracks in existing concrete pavement, the quantity to be paid will be the length in feet, as determined by field measurement along the cracks.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 17, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **425**  
Proposed Specification: **4250201 Inlets, Manholes, and Junction Boxes.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by This change was proposed by Tim Holley from the Roadway Design Office to add concrete requirements for concrete aprons.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## INLETS, MANHOLES, AND JUNCTION BOXES (REV 10-20-20)

SUBARTICLE 425-2.1 is deleted and the following substituted:

### **425-2 Composition and Proportioning.**

**425-2.1 Concrete:** For inlets, manholes, and junction boxes, use Class II or IV concrete, as designated in the Plans and Standard Plans and as specified in Section 346. For concrete aprons and yard drains, use concrete as specified in Section 347.

SUBARTICLE 425-3.2 is deleted and the following substituted:

**425-3.2 Gratings, Covers, and Frames:** Use gratings and frames fabricated from structural steel or cast iron as designated in the appropriate Standard Plans Index. When “Alt. G” grates are specified in the Plans, provide structural steel grates that are galvanized in accordance with the requirements of ASTM A123 and hardware galvanized in accordance with the requirements of ASTM A153.

Use rigid frames and covers either 24 inches or 36 inches or optional three-piece adjustable frames and covers as indicated in Standard Plans, Index 425-001.

For three-piece adjustable frames, the inner frame may include replaceable resilient seats to support the cover. In addition, the inner frame shall indicate it is adjustable, by clearly having the word “adjustable” imprinted into the exposed portion of the inner frame so “adjustable” is visible from the roadway after installation.

ARTICLE 425-8 is deleted and the following substituted:

### **425-8 Method of Measurement.**

The quantities to be paid for will be the number of inlets, manholes, junction boxes, and yard drains, completed and accepted; and the number of structures of these types (including also valve boxes) satisfactorily adjusted. Performance Turf will be paid in accordance with Section 570.

SUBARTICLE 425-9.1 is deleted and the following substituted:

### **425-9 Basis of Payment.**

**425-9.1 New Structures:** Price and payment will be full compensation for furnishing all materials and completing all work described herein or shown in the Plans, including all clearing and grubbing outside the limits of clearing and grubbing as shown in the Plans, all excavation except the volume included in the measurement designated to be paid for under the items for the grading work on the project, all backfilling around the structures, the disposal of surplus material, and the furnishing and placing of all aprons, gratings, frames, covers, and any other necessary fittings.

SUBARTICLE 425-9.3 is expanded by the following:

**425-9.3 Payment Items:** Payment will be made under:

- Item No.425- 1- Inlets - each.
- Item No.425- 2- Manholes - each.
- Item No.425- 3- Junction Boxes - each.
- Item No.425- 4- Adjusting Inlets - each.
- Item No.425- 5- Adjusting Manholes - each.
- Item No.425- 6- Adjusting Valve Boxes - each.
- Item No.425- 8- Adjusting Miscellaneous Structures - each.
- Item No.425- 10- Yard Drains - each.
- Item No. 425- 17- Back of Sidewalk Endwall - each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 18, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **450**  
Proposed Specification: **4500802 Precast Prestressed Concrete Construction.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Thomas Frank from the State Materials Office to adjust allowable stress in CFRP stands and additional editorial changes.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**PRECAST PRESTRESSED CONCRETE CONSTRUCTION**  
**(REV 11-4-20)**

SUBARTICLE 450-8.2.1 is deleted and the following substituted:

**450-8.2 Operations:**

**450-8.2.1 General:** The tensioning operations consist of the application of the final force or load required by the Plans and with adjustments for abutment rotation, bed shortening, anchorage header movement, live end seating, dead end seating, splice chuck seating, friction in the jacking system and any other elements as applicable for the type of bed and anchorage used. Also, adjust the force when the temperature differential between the ambient temperature at time of stressing and the expected concrete temperature at time of placement is greater than 25°F. Increase the force at the rate of 1% for each 10°F increment that the ambient temperature at time of stressing is below the expected concrete temperature at time of placing. Decrease the force at the rate of 1% for each 10°F that the ambient temperature at time of stressing is above the expected concrete temperature at the time of placing. Do not allow the stress in the steel prestressing strand to exceed 80% of the specified tensile strength of the strand, after seating. Do not allow the stress in the CFRP prestressing strand to exceed ~~70~~<sup>65</sup>% of the specified tensile strength of the strand, after seating. During each tensioning operation, for the verification of the live and dead end seating, check the seating of at least 4 strands or a minimum of 10% of the total number of strands, whichever is greater. Maintain a record of the tensioning operation.

Compensation for temperature differential and abutment rotation are not required for self-stressing beds. However, adjust the final load for the effects of bed shortening due to the load from all the strands.

If the placement of concrete is delayed for more than seven calendar days after the completion of the stressing operation, check and adjust the final strand load as necessary before placement of concrete and maintain a record of the stressing operation.

Accomplish tensioning by either single strand tensioning or multiple strand tensioning, and ensure that it is symmetrical about the vertical axis of the product. Tensioning methods, in general, consist of tensioning to the required loads indicated by the jacking system, or tensioning to the required load while monitoring the elongation of the prestressing strand.

Production personnel will perform tensioning operations under supervision of personnel possessing a certificate of completion of PCI Quality Control Personnel Certification Level II, and Section 450 Specification examination, or certified personnel may perform tensioning operations directly.

SUBARTICLE 450-11.6.1 is deleted and the following substituted:

**450-11.6.1 Beam Ends that will not be Permanently Encased in Concrete Diaphragms:**

1. Remove any corrosion product from all accessible surfaces at the cut end of the strands.

2. Apply two layers of epoxy to the exposed beam ends (including clipped and chamfered surfaces) at the applicable time frame below:

a. For beams without debonded strands, at least ~~3~~<sup>three</sup> calendar days prior to shipping but no later than 50 calendar days after detensioning.

b. For beams with debonded strands, at least 3 calendar days prior to shipping, or between ~~42~~<sup>45</sup> and 50 calendar days after detensioning, whichever occurs first. ~~If the beam requires shipment prior to 42 calendar days, at least three calendar days prior to shipping.~~

3. As an option to item 2b, the epoxy may be applied in two steps as follows:

a. To the upper area of the beam end within 4 inches of the outer stands of the bottom strand group any time after detensioning.

b. To the remaining area that includes the bottom strand group between 42 and 50 calendar days after detensioning. Ensure that the entire beam end is fully coated at least ~~3~~<sup>three</sup> calendar days prior to shipping.

Ensure that the first epoxy layer is cured before applying the second layer.

The finished thickness of the epoxy coating must be a minimum of 1/16 inch and form a vertical flat plane without deviations or localized depressions from recessed strands or other defects.

Ensure that the epoxy coating is cured per the manufacturer's recommendations prior to shipping the products.

Any modifications to the time limits above must be approved by the Engineer.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 13, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **455**  
Proposed Specification: **4551706 Structures Foundation.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Juan Castellanos from the Construction Office to simplify the requirements for the CSL tomography analysis.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STRUCTURES FOUNDATIONS****(REV 11-75-210)**

SUBARTICLE 455 - 17.6.2 is deleted and the following substituted:

**455-17.6.2 Cross Sonic Logging (CSL) and Tomography:** When required by the Engineer, perform CSL testing in accordance with ASTM D6760. Engage a qualified Specialty Engineer to perform the CSL testing. The qualified CSL Specialty Engineer must be a Professional Engineer in the State of Florida and have a minimum six months experience of CSL testing, supervising the collection of CSL data and interpretation of CSL results. The individual performing the CSL testing in the field must work for the Specialty Engineer firm and have a minimum of six months experience of CSL testing. The Contractor shall provide all necessary access and assistance to the CSL Specialty Engineer to satisfactorily perform the testing.

When a shaft contains four tubes, test every possible tube combination. For shafts with five or more tubes, test all pairs of adjacent tubes around the perimeter, and one-half of the remaining number of tube combinations, as chosen by the Engineer. Pull the probes simultaneously, starting from the bottoms of the tubes, over an electronic depth measuring device. Perform the CSL tests with the source and receiver probes in the same horizontal plane. Continuously record CSL signals at depth intervals of 2-1/2 inches or less from the bottom of the tubes to the top of each shaft. Remove all slack from the cables prior to pulling to provide accurate depth measurements in the CSL records. When the measurements indicate a 30% or greater reduction in velocity between one or more pairs ~~perform~~, take one or two concrete cores to allow further evaluation and repair, or replace the shaft as directed by the Engineer. Determine the location of the concrete cores by performing 3D tomographic analysis using the CSL measurements. The core depths shall be at least 5 feet deeper than the bottom of the anomaly determined by the 3D tomography analysis as indicated below or full depth if the anomaly is within 5 feet of the bottom of the shaft. The Engineer may accept a drilled shaft without rock cores if an EAR demonstrates that the anomaly does not affect the structural and the geotechnical axial capacity, the structural and geotechnical lateral stability, the settlement behavior of the shaft, and that the anomaly will not impact the durability of the foundation.

~~To perform 3D tomography analysis, conduct offset CSL measurements between the tube pair combinations in addition to the horizontal measurements. Record offset measurements with source and receiver vertically offset in the tubes. These measurements add four measurements per tube combination to the horizontal measurements described in this section. Offset measurements are described by the angle, in degrees, and direction the signal travels between the probes with respect to the horizontal plane: plus 45, plus 22.5 (source below receiver), and minus 45, minus 22.5 (source above receiver). Record offset measurements from the point where the higher probe is at least 5 feet below the velocity reduction to the point where the lower probe is at least 5 feet above the velocity reduction. When repairs are done, provide~~  
When repairs are done, perform CSL measurements in all tube pair combinations with the source and receiver running at the same horizontal plane at the vertical offsets of 45 degrees above and below. Perform all measurements including the offset measurements from the point where the higher probe is at least 5 feet below the lower limit of the repaired zone to the point where the lower probe is at least 5 feet above the upper limit of the repaired zone. ~~Perform offset~~Offset measurements must be as follows: plus 45 degrees (source below receiver) and provide minus 45 degrees (source above receiver). Use the measurements of these two offsets in combination

with the horizontal measurements to perform the 3D tomography. Provide the CSL measurements, CSL logs and 3D tomographic analysis at no additional cost to the Department.

After acceptance of production shafts by the Engineer, fill the tubes or core holes with a structural non-shrink grout in accordance with 455-17.6.1.

If the Contractor determines at any time during the non-destructive testing and evaluation of the drilled shaft that the drilled shaft should be replaced, no further testing or evaluation of that shaft is required.

**455-17.6.2.1 Required CSL Reports:** Present the CSL data and analysis results to the Engineer in a signed and sealed report. Include CSL logs with analyses of first pulse arrival time (FAT) versus depth and pulse energy/amplitude versus depth. Present a CSL log for each tube pair tested with any defect zones identified on the logs and discussed in the test report as appropriate. When offset measurements are required, perform 3D tomographic analysis using all offset data, and include color coded 3D tomographic images in the report.

**455-17.6.2.2 Evaluation of Cross Hole Sonic logging Testing:** The Engineer will evaluate the observations during drilled shaft construction and the CSL test results to determine whether or not the drilled shaft construction is acceptable. Drilled shafts with velocity reduction exceeding 30% are not acceptable without an engineering analysis.

**455-17.6.2.3 Coring and/or Repair of Drilled Shafts:** If the Engineer determines a drilled shaft is unacceptable based on the CSL test and other testing, core the shaft to allow further evaluation and repair, or replace the shaft in accordance with 455-17.6.1.5.

If repairs are performed or additional shafts installed to correct a deficient foundation, conduct integrity testing and submit the results to the Engineer in accordance with 455-17.6.1.5.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 7, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **462**  
Proposed Specification: **4620704 Post-Tensioning.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jacqueline Petrozzino-Roche from the Structures Design Office to modify the word "Alternately" to "Additionally to clearly state the Department's policy. Both the flow cone test and the wet density test are required when grout filler is used to fill post-tensioning tendon ducts.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**POST-TENSIONING**  
**(REV 11-12-20)**

SUBARTICLE 462-7.4.1.5.3 is deleted and the following substituted:

**462-7.4.1.5.3 Production Test:**

1. Test grout fluidity to verify it is within limits established by grout manufacturer during grouting operations. Target fluidity rate is established by manufacturer's representative based on ambient weather conditions.
2. Determine grout fluidity in accordance with Section 938.
  - a. Perform a fluidity test using flow cone on grout discharged from anchorage cap outlet immediately after uncontaminated uniform consistency discharge begins for each tendon greater than 50 feet in length. For tendons 50 feet or less, perform a fluidity test on a per batch basis. For fluidity tests done on a per batch basis, perform test after new batch has been transferred from mixing tank to holding tank and thoroughly mixed with remains of the previous batch to produce a new homogenous mixture. During mixing process, continually re-circulate grout from hose into holding tank. Ensure measured grout efflux time is not less than efflux time measured at injection end of grout hose.
    - b. ~~Additionally~~ ~~Alternately~~, check grout fluidity using Wet Density method contained in Section 938. Density at discharge outlet must not be less than grout density at inlet. Continuously discharge grout until density requirements are met. Discard grout used for testing fluidity.
3. Perform fluidity test for each tendon to be grouted without modifying water-cement ratio.
4. Check temperature of grout at inlet end of grout hose hourly to verify conformance to this Section.
5. Obtain a sample from first production batch of grout and perform a wick induced bleed test on this sample in accordance with Section 938 at beginning of each day's grouting operation. Begin grouting operations after sample is obtained.
6. Once grouting has begun, if zero bleed requirement is found to not have been achieved in the wick induced bleed test at any time during required test time period, complete grouting of any partially grouted tendons currently being grouted but do not begin grouting any new or additional tendons. Immediately inform the Engineer when grouting operations have ceased due to non-compliance of the wick induced bleed test.
7. Do not re-start grouting operations until such time that testing shows grout meets specified requirements.



*Florida Department of Transportation*

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GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **520**  
Proposed Specification: **5200602 CONCRETE GUTTER, CURB ELEMENTS, AND  
TRAFFIC SEPARATOR.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the State Estimates Office to establish separate payment for joints at concrete pavement in the Standard Specification. Please note this is a companion change to the revision 3502002 (Cement Concrete Pavement).

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**CONCRETE GUTTER, CURB ELEMENTS, AND TRAFFIC SEPARATOR****(REV ~~11-13-201~~)**

SUBARTICLE 520-6.2 is expanded by the following:

**520-6.2 Expansion Joints:** Construct expansion joints at all inlets, at all radius points, and at other locations indicated in the Plans. Locate them at intervals of 500 feet between other expansion joints or ends of a run. Ensure that the joint is 1/2 inch in width.

ARTICLE 520-11 is expanded by the following:

**520-11 Method of Measurement.**

For curb or curb and gutter, the quantity to be paid will be the plan quantity, in feet, measured along the face of the completed and accepted curb or curb and gutter. Curb for sidewalk curb ramps or driveways will be paid at the Contract unit price for the adjacent curb type.

For valley gutter or shoulder gutter, the quantity to be paid will be the plan quantity, in feet, measured along the gutter line of the completed and accepted valley gutter or shoulder gutter.

For concrete traffic separator of constant width, meeting the requirements of Standard Plans, Index 520-020, the quantity to be paid will be the plan quantity, in feet, measured along the center of its width, completed and accepted, including the length of the nose.

For concrete traffic separator of nonstandard or varying width, the quantity to be paid will be the plan quantity, in square yards, completed and accepted.

For curb of any type next to concrete pavement, the curb-pavement joint quantity to be paid will be the plan quantity, in feet, measured along the face of the completed and accepted curb.

SUBARTICLE 520-12.3 is expanded by the following:

**520-12.3 Payment Items:** Payment will be made under:

- Item No. 520- 1- Concrete Curb and Gutter - per foot.
- Item No. 520- 2- Concrete Curb - per foot.
- Item No. 520- 3- Concrete Valley Gutter - per foot.
- Item No. 520- 4- Curb-Concrete Pavement Joint - per foot.
- Item No. 520- 5- Concrete Traffic Separator - per foot.
- Item No. 520- 6- Concrete Shoulder Gutter - per foot.
- Item No. 520- 70- Concrete Traffic Separator - per square yard.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 7, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **522**  
Proposed Specification: **5220200 CONCRETE SIDEWALK AND DRIVEWAYS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to update density requirements for foundation materials in sidewalks and driveways to the Standard Specification. Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONCRETE SIDEWALK AND DRIVEWAYS (REV 11-13-20)

ARTICLE 522-2 is expanded by the following:

### **522-2 Materials.**

Meet the requirements specified in 520-2 and the embankment utilization requirements of Standard Plans Index 120-001.

ARTICLE 522-4 is deleted and the following substituted:

### **522-4 Foundation.**

~~Shape and compact the foundation materials to a firm, even surface, true to grade and cross-slope. Compact areas that have been excavated more than 6 inches below the bottom of the concrete, to a minimum of 95% of AASHTO T99 density. The area to be compacted includes the area directly under and 1 foot beyond each side of the sidewalk or driveway, when right-of-way allows.~~ Shape and compact the foundation materials with suitable equipment to a firm, even surface, true to grade and cross-slope. Compact cut-and-fill areas within 1 foot beyond each side of the sidewalk or driveway, when right-of-way conditions allow. Meet the testing frequency and maximum lift thickness requirements of Section 120. Record density test results in the Earthwork Records System (ERS) section of the Department's database for the foundation material below the bottom of concrete for a minimum depth of 2 feet for fill areas, and 1 foot for cut areas, to a density not less than 95% of the maximum density as determined by FM 1-T099. Compact the material in the remaining fill areas to match the adjacent area density.



*Florida Department of Transportation*

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GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **522**  
Proposed Specification: **5220703 CONCRETE SIDEWALK AND DRIVEWAYS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Bobby Bull from the Roadway Design Office to clarify requirements for sidewalk cross slopes to meet ADA Standards in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONCRETE SIDEWALK AND DRIVEWAYS

(REV ~~11-3~~12-14-20)

ARTICLE 522-7 is expanded by the following:

### **522-7 Finishing.**

**522-7.1 Screeding:** Strike-off the concrete by means of a wood or metal screed, used perpendicular to the forms, to obtain the required grade and remove surplus water and laitance.

**522-7.2 Surface Requirements:** Imprint concrete as detailed in the Plans, otherwise provide a broom finish. Ensure that the surface variations are not more than 1/4 inch under a 10-foot straightedge or more than 1/8 inch on a 5-foot transverse section. Finish the outer edges of the concrete with an edging tool having a radius of 1/2 inch.

**522-7.3 Sidewalk Cross Slope Requirements:** Construct sidewalk with cross slope as shown in the Plans and Standard Plans. ~~When a cross slope is specified, this cross slope is not to be exceeded.~~ Sidewalks must have some cross slope, but no more than 2.0%, in either the positive or negative direction after construction.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **526**  
Proposed Specification: **5260201 ARCHITECTURAL PAVERS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim Counts from the State Materials Office to include concrete pavers for local side streets and adjust pay item language in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**ARCHITECTURAL PAVERS  
(REV 12-2-20)**

SUBARTICLE 526-2.1 is deleted and the following substituted:

**526-2 Materials.**

**526-2.1 General:** Architectural pavers shall meet the following requirements:

Table 526-1 Architectural Paver Requirements			
Proposed Use	ASTM C902 (Brick Paver)	ASTM C1272 (Brick Paver)	ASTM C936 (Concrete Paver)
<del>Roadways</del> <u>Local Side Streets (<math>\leq</math> 35 mph Design Speed)</u>	Do Not Use	X	<del>Do Not Use</del> X
Commercial Driveways	Do Not Use	X	X
Sidewalks and Medians	X	Do Not Use	X
Residential Driveways	X	Do Not Use	X

Ensure that the pavers are consistent in color, size, and appearance. Architectural paver type, pattern, shape and/or color will be in accordance with plan details, when specified.

ARTICLE 526-5 is deleted and the following substituted:

**526-5 Basis of Payment.**

Price and payment will be full compensation for all work, including all materials, equipment, labor, and incidentals necessary to complete the work.

Payment shall be made under:

- Item No. 526- 1- ~~1~~ 1 Pavers, Architectural (~~Roadway~~) - per square yard.
- ~~Item No. 526- 1- 2 Pavers, Architectural (Sidewalk) - per square yard.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **536**  
Proposed Specification: **5360314 GUARDRAIL.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Richard Stepp from the Roadway Design Office to update language in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**GUARDRAIL**  
**(REV 10-23-20)**

SUBARTICLE 536-3.14 is deleted and the following substituted:

**536-3.14 Approach Terminal Assemblies:** Install approach terminal assemblies as specified in the Plans and APL drawings and in accordance with the geometry and adjacent grading of the Standard Plans. The APL number must be permanently marked on each assembly at a readily visible location using legible lettering at least 3/4 inch in height.

If the Plans call for a ~~"flared"~~an approach terminal assembly and do not identify the specific system to be used, the contractor has the option to construct any Department-approved ~~"flared"~~approach terminal assembly identified on the APL that meets the applicable test criteria, subject to the conditions identified in the Plans or the APL drawings.

~~————— Likewise, if the Plans call for a "parallel" approach terminal assembly and do not identify the specific system to be used, the contractor has the option to construct any Department-approved "parallel" terminal assembly identified on the APL, subject to the conditions identified in the Plans or the APL drawings.~~

SUBARTICLE 536-5.5 is deleted and the following substituted:

~~**536-5.5 Bridge Anchorage Assembly/Approach Transition Connection to Rigid Barrier:**~~ The quantity paid for will be the number of each, constructed, in place and accepted.

SUBARTICLE 536-5.7 is deleted and the following substituted:

**536-5.7 Guardrail End Treatment:** The quantity paid for will be the number of each type as designated, constructed, in place, and accepted. Guardrail end treatment types may include ~~parallel or flared~~ approach terminals, trailing anchorages, CRT end treatments, and double faced approach terminals as defined in the Standard Plans.

SUBARTICLE 536-6.1 is deleted and the following substituted:

**536-6.1 Guardrail:** Price and payment will be full compensation for all work specified under this Section, except those items specified in 536-6.2 through 536-6.7. Price and payment includes furnishing and installing posts, panels, barrier delineators, offset blocks, and all other materials as defined in the Plans and the Standard Plans. The price and payment will include any reduced post spacing, nested panels, shop-bent panels, end unit panels, ~~trailing end transition connections to rigid barrier,~~ and CRT posts as required in the Plans.

The type of guardrail specified will be that which comprises the guardrail run between end treatments and transition connections to rigid barrier (including, but not limited to, ~~w-~~beam general, ~~w-~~beam double face, ~~w-~~beam low-~~s-~~speed, modified thrie-~~s-~~beam). For guardrail systems with direct connections between end treatments and transition connections to

rigid barrier, the type of guardrail specified will be w-beam for single face guardrail applications or double faced for double face guardrail applications.

SUBARTICLE 536-6.5 is deleted and the following substituted:

**536-6.5 ~~Bridge Anchorage Assembly/Approach~~ Transition Connection to Rigid Barrier:** Price and payment will include all costs for furnishing and installing all hardware for approach or trailing transition connections to rigid barrier per the Standard Plans that are in addition to the cost of items included in 536-6.1. This includes costs for the concrete transition block or alignment curb and its transition where shown in the Standard Plans and barrier delineators for existing post and beam bridge railings. This item applies for connections to concrete barrier, concrete pier protection barrier, and concrete or metal bridge traffic railing, including thrie-beam retrofits.

SUBARTICLE 536-6.8 is deleted and the following substituted:

**536-6.8 Payment Items:** Payment will be made under:

- Item No. 536- 1- Guardrail - per foot.
- Item No. 536- 5- Rub Rail - per foot.
- Item No. 536- 6- Pipe Rail - per foot.
- Item No. 536- 7- Special Guardrail Post - each.
- Item No. 536- 8- ~~Bridge Anchorage Assembly/Approach~~ Transition Connection to Rigid Barrier - each.
- Item No. 536- 73- Removal of Existing Guardrail - per foot.
- Item No. 536- 85- Guardrail End Treatment - each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 28, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **548**  
Proposed Specification: **5480805 RETAINING WALL SYSTEMS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to update language referencing the Materials Manual in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## RETAINING WALL SYSTEMS (REV 11-3-20)

SUBARTICLE 548-8.5.2 is deleted and the following substituted:

**548-8.5.2 Thick Lift Option for Compacted Select Backfill:** If through field tests, the Contractor can demonstrate that the compaction equipment can achieve density for the full depth of a thicker lift, the backfill may be constructed in successive courses of not more than 10 inches compacted thickness.

Based on the results of a full-height test wall constructed by each Contractor or MSE wall sub-contractor, the Engineer will approve each Contractor's or MSE wall sub-contractor's specified compaction procedures. The length of the test wall shall be the length required to produce one LOT of 500 feet at the top of the wall. When all individual walls using this option are less than 500-feet long, the test wall may be broken into two segments comprising separate LOTs. Both segments must be accepted to determine the required ~~%~~percent compaction for the remaining walls. For each Contractor or MSE wall sub-contractor, the height of the test wall shall be 20 feet or the highest wall using this option, whichever is less. Lower height walls may be constructed using these procedures until a full height test wall is constructed. Notify the Engineer prior to beginning construction of a test wall.

Perform one set of QC density tests per thick lift of the test wall on the backfill within three feet behind the wall face and one set of QC density tests per thick lift of the test wall on the backfill placed beyond three feet behind the wall face, at random locations within each LOT. At each QC density test, the set will include testing the entire lift thickness and a dig down test of the bottom 6 inches. Excavate materials as needed to allow testing of the bottom 6 inches, at no expense to the Department. Maintain the exposed surface as close to undisturbed as possible; no further compaction will be permitted during the test preparation. The Department will perform verification testing of density for the bottom 6 inches and the entire lift thickness at the frequency indicated in 548-9.6. All QC tests and a Department Verification test must meet the density required by 548-9.4.

Identify the test wall with the required ~~%~~percent compaction effort and thickness in the [Logbook Earthwork Records System \(ERS\) portion of the Department's database](#). If the thick lift density does not meet or exceed the thick lift density results during the test wall, perform dig-down density tests to verify the density of the bottom 6 inches of the lift. The Contractor may elect to place material in 6 inches compacted thickness at any time. Once approved, a change in the source of backfill material will require the construction of a new test wall. Do not change the compaction effort once the test wall is approved. The Engineer will periodically verify the density of the bottom 6 inches during thick lift operations. If unable to achieve the required density, remove and replace or repair the test wall to comply with the specifications at no additional expense to the Department. The Engineer may terminate the use of thick lift construction and instruct the Contractor to revert to the 6 inches maximum lift thickness if the Contractor fails to achieve satisfactory results or meet the requirements of this Section.

SUBARTICLE 548-9.2 is deleted and the following substituted:

**548-9.2 Maximum Density Determination:** For select backfill, determine the maximum QC density in accordance with FM 1-T180, ~~Method D~~. When compacting A-3 or A-2-4 materials to meet the alternate acceptance criteria in 548-9.4.1, determine the maximum density in accordance with FM 1-T099.

Perform gradation tests on the sample collected in accordance with AASHTO T27 and FM 1-T011. Classify soils in accordance with AASHTO M145 to determine compliance with embankment utilization requirements.

SUBARTICLE 548-9.3 is deleted and the following substituted:

**548-9.3 Density Testing Requirements:** Ensure compliance with the requirements of nuclear density testing in accordance with FM 1-T238. Determine the in-place moisture content for each density test. Use FM 1-T238, FM 5-507 (Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester), or FM 5-535 (Laboratory Determination of Moisture Content of Granular Soils by Use of a Microwave Oven) for moisture determination.

Perform these tests at a minimum frequency of one set of tests per LOT.

Determine test locations including stations and offsets, using the random number generator provided by the Engineer. Do not use note-pads or work-sheets to record data for later transfer to the ~~density log book~~ ERS portion section of the Department's database. Notify the Engineer upon successful completion of QC testing on each LOT.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 22, 2021

Frank Corrado  
Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **611**  
Proposed Specification: **6110202 ACCEPTANCE PROCEDURES FOR TRAFFIC CONTROL SIGNALS, DEVICES, AND INTELLIGENT TRANSPORTATION SYSTEM DEVICES. (FINAL REVISION)**

Dear Mr. Corrado:

Based on your comments, we are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to add final acceptance requirements and field acceptance requirements for Intelligent Transportation System (ITS) Devices. A new pay item was also established in the Standard Specification.

Please review for final approval by close of business February 24, 2021. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us) and [darla.hunsicker@dot.state.fl.us](mailto:darla.hunsicker@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh  
Attachment

**ACCEPTANCE PROCEDURES FOR TRAFFIC CONTROL SIGNALS, DEVICES, AND INTELLIGENT TRANSPORTATION SYSTEM DEVICES**

(REV ~~11-132-19-210~~)

SUBARTICLE 611-2.2 is deleted and the following substituted:

**611-2.2 Final Acceptance:** The Engineer will make inspection for final acceptance of traffic control signal and device installations as part of all work under the Contract in accordance with 5-11, only after satisfactory completion of all field tests of completed installations and on the basis of a comprehensive field inspection of all equipment installations. ~~Submit Form 750-010-02, Submittal Data – Traffic Control Equipment for each cabinet location to the Engineer. The Engineer will make the final inspection with a Contractor's representative and a representative of the agency designated to accept maintenance responsibility. The Engineer will submit the approved form to the District Traffic Operations Engineer and place a hard copy in the cabinet at each location. Transfer warranties and guarantees on equipment to the Department in accordance with Section 608. For traffic signal installations, submit form 700-010-22, Final Acceptance of Traffic Signal Installation(s) and Transfer of Maintenance, to the Engineer.~~

SUBARTICLE 611-2.2 is expanded by the following:

**611-2.2.1 Traffic Control Signal and Device Installation:** Submit Form 750-010-02, Submittal Data – Traffic Control Equipment for each cabinet location to the Engineer. The Engineer will make the final inspection with a Contractor's representative and a representative of the agency designated to accept maintenance responsibility. The Engineer will submit the approved form to the District Traffic Operations Engineer and place a hard copy in the cabinet at each location. Transfer warranties and guarantees on equipment to the Department in accordance with Section 608. For traffic signal installations, submit form 700-010-22, Final Aacceptance of Traffic Signal Installation(s)), and Transfer of Maintenance, to the Engineer.

**611-2.2.2 Intelligent Transportation System Device Installation:** The Engineer will make the final inspection with a Contractor's representative and a representative of the agency designated to accept maintenance responsibility. Transfer warranties and guarantees on equipment to the Department in accordance with Section 608. Final acceptance of ITS installation is contingent on successfully completing the ITS Acceptance Test section.

SUBARTICLE 611-2.3 is deleted and the following substituted:

**611-2.3 As-Built Documentation:** As a condition precedent to acceptance under 611-2.1 or 611-2.2, submit as-built drawings for all installations, signed and sealed by a Professional Engineer or Professional Surveyor and Mapper registered in the State of Florida, along with supplemental as-built information using Feature Import Templates and Attribute Forms used for the Department's ITS Facility Management (ITSFM) System. Feature Import Templates can be found on the Department's web site:

<https://www.fdot.gov/traffic/itsfm>~~<https://www.fdot.gov/traffic/ITSFM/index.shtml>~~.

**611-2.3.1 Submittal Requirements:** Submit as-built plans for review by the Engineer. As-built plans must be PDF files, in the same scale and content as the Contract Plans, and formatted on 11-inch by 17-inch sheets. Signing and pavement marking plan sheets may be used instead of signalization plan sheets, if a substantial number of changes from the original Plans must be recorded. If, in the opinion of the Engineer, the changes cannot be clearly delineated on the existing drawings, clearly delineate all changes on 11-inch by 17-inch detail sheets, enlarged 200% from the reproductions.

Submit fiber optic splicing diagrams detailing all cable splices, terminations, equipment port assignments, and optical circuit path names within the communication network. Include cable manufacturer, type, strand count, and cable sequential reading at each pull box entrance/exit, each side of the splice enclosure, and at patch panel terminations.

As-built submittals must include an inventory of all traffic control signals and devices, and support structures. The inventory must include horizontal position geographic coordinate data collected using Differential Global Positioning System (DGPS) equipment. The inventory must include, at a minimum, the manufacturer, model, and serial number for each device or completed assembly. Submit coordinate data for pull boxes as well as conduit and cable at 100-foot intervals including changes in direction. All support structures, equipment cabinets and other fixed location features must be assigned a unique site ID name to create a common association between the as-built plans, inventory forms, and the ITSFM system. Include data for all components listed in 611-2.3.2, except those listed in 611-2.3.2.2 and 611-2.3.2.5.

Aerial photographs may be submitted with as-built plan submittals to provide supplementary information. The aerials should not include extra features such as the right of way, baseline, or roadway edges. The aerials may be used as a base for the as-built plans with mile post and offset dimensions. Make any corrections resulting from the Engineer's review, and resubmit as-built plans as a condition precedent to acceptance of the installation.

Submit the ITSFM electronic files in any of the following software formats:

1. As-built Plans – Design Files (DGN) and Portable Document Format (PDF)
2. Feature Import Templates – Spreadsheet format (XLSX)
3. Feature Attribute Forms – Portable Document Format (PDF)
4. Differentially Corrected GPS files – (COR)
5. GPS Export Files – Comma-Separated Values (CSV)
6. Photos – Joint Photographic Experts Group (JPG)

**611-2.3.2 Components:** As a minimum, identify all traffic control devices, poles, support structures, cabinets, pull and splice boxes, hubs, conduit duct banks, access points, and power services, and utility demarcation points.

**611-2.3.2.1 Conduit and Cable:** Identify all conduit and cable with unique line styles for routing (conduit communication, electrical, and joint-use trenched) that are clearly identified in a legend on each plan sheet. Identify the type of cable (example - 7 conductor signal cable) and label the number of conductors, fiber strands or other identifying features of the cable. For conduit duct banks, clearly note conduit and innerduct size, length, material, and number of runs.

**611-2.3.2.2 Loops and Detection Zones:** Identify the location of all installed loops (including the distance from the stop bar for the advance loops), the path of each loop to the pull box, the loop window and the path of the loop lead-in to the controller cabinet.



Identify the device location and the approximate detection area for detection systems that are not embedded in or under pavement.

**611-2.3.2.3 Pull Boxes:** Label unused and out of service pull boxes clearly. Show distances to each pull box from the nearest edgeline, stop bar, or other permanent feature. If an edgeline is not near a pull box or would not clearly identify its location; a fixed monument may be used (example - FDOT pole or structure).

**611-2.3.2.4 Poles:** Identify poles from the nearest edgeline of both approaches. If an edgeline is not near a pole or would not clearly identify its location, a fixed monument may be used.

**611-2.3.2.5 Signal Heads:** As-built plans must show the final location of signal heads. Each signal head shall be identified by its corresponding movement number.

**611-2.3.2.6 Cabinet:** The type of cabinet and inventory of internal components must be documented. Controller manufacturer along with the controller model number shall be submitted for all traffic signal cabinets. A cabinet corner “blow up” shall be submitted detailing pull box locations with all conduit and cable.

**611-2.3.3 Compensation:** All costs incurred in submitting as-built documentation are incidental to the other items of work associated with traffic control signals and devices.

Payment for ITSFM files will be compensated as specified in this Section.

ARTICLE 611-4 is deleted and following substituted:

#### **611-4 Field Tests of Installations.**

Perform the following tests in the presence of the Engineer and, when applicable, a representative of the agency designated to accept maintenance responsibility.

##### **611-4.1 Traffic Control Signal and Device Installation:**

**Continuity:** Test each signal head circuit, pedestrian detector circuit, vehicle detector loop circuit, and interconnect signal circuit for continuity.

**Functional:** Perform a functional test that demonstrates that ~~each and~~ every part of the installation functions as specified.

**Induced Voltage on traffic signal connections:** Measure the voltage between each signal head indication field terminal and the AC neutral circuit in the controller cabinet during the off (dark) state of each signal head indication. Ensure that the voltage does not exceed  $2 V_{AC, RMS}$ . If this value is exceeded, take the following action to reduce the value to  $2 V_{AC, RMS}$ :

1. Check for loose or broken connections in the signal head circuit from the controller cabinet to the signal heads.

2. If (1) above does not correct the problem, connect additional neutral circuits between the signal head and the controller cabinet.

**Inductive Loop Assembly:** An inductive loop assembly is defined as a loop plus the lead-in cable. Measure and record the series resistance of each inductive loop assembly. Ensure that the resistance does not exceed  $10 \Omega$ . Perform an insulation resistance megger test, at  $500 V_{DC}$ , for each inductive loop assembly at the cabinet in which the inductive loop assembly is terminated. Do not connect the inductive loop assembly to the cabinet terminal strips during the test, except for the drain wire of a shielded lead-in cable. Insulation resistance is defined as the resistance between one wire of the lead-in cable and a ground rod or bussbar. Record the insulation resistance of each inductive loop assembly. Ensure that the resistance is equal to or greater than  $100 M\Omega$ .

Perform the 48-hour test only after achieving acceptable results from the other tests listed in 611-4.

**48-Hour Test for Traffic Signal installations:**

1. Before beginning the 48-hour test, place all new signal installations (no existing signals) in flash for 48 to 336 hours. The length of the flash period will be determined by the Engineer.

2. Continuously operate each new or modified traffic signal installation or system for not less than 48 hours. If unsatisfactory performance of the system develops, correct the condition, and repeat the test until obtaining 48 hours of satisfactory continuous operation.

3. During the 48-hour test period, the Contractor is fully responsible for the signal or signal systems. Provide a responsible representative (technically qualified) who can monitor signal operation and troubleshoot any malfunctions within a one-hour period.

When coordination is specified in the Contract Documents, provide a two-hour training session on the operation and programming of the coordination features of the controller units during the 48-hour test. Arrange the time and place of the training session with the Engineer.

4. Perform a 48-hour test for flashing beacon installations in the same manner as for traffic signal installations.

5. Start the 48-hour test on a Monday, Tuesday, or Wednesday. Ensure the 48-hour test does not include weekends, Holidays, or Special Events.

6. Start the 48-hour test between 9:00 AM and 2:00 PM.

7. Before the 48-hour test, install and have standing by all equipment specified in the Contract Documents.

**611-4.2 Intelligent Transportation System Device Installation: Test all stand-alone functions of the ITS devices as detailed in the Contract Documents and as approved by the Engineer.**

For the managed field Ethernet switch (MFES), complete FDOT Form Number 750-040-07 for all installed field switches or other procedure approved by the Engineer.

For the closed-circuit television (CCTV) camera, complete FDOT Form Number 750-040-08 for all installed CCTV cameras or other procedure approved by the Engineer.

For microwave vehicle detection system (MVDS), complete FDOT Form Number 750-040-09 for all installed MVDS sensors or other procedure approved by the Engineer.

For ITS devices without official FDOT forms, evaluate ITS devices as per Contract Documents and as approved by the Engineer.

Complete approved data forms and turn them over to the Engineer for approval. Provide a minimum notice of 10 calendar days prior to all tests to permit the Engineer or their representative to observe each test.

If any unit fails to pass its stand-alone test, correct the unit, or substitute another unit in its place, then repeat the test.

If a unit has been modified as a result of a stand-alone test failure, prepare a report describing the nature of the failure and the corrective action taken and submit it to the Engineer prior to re-testing the unit. If a failure pattern develops, the Engineer may direct that modifications be made to all units without additional cost to the Department or an extension of the Contract Time.

ARTICLE 611-5 is deleted and the following substituted:

**611-5 ITS System Acceptance Test-Contractor's Warranty Period for Installations.**

~~611-5.1 General Requirements: Repair or replace any defective components or work of the installations for a 90-day period after final acceptance.~~

~~611-5.2 Contractor's Responsibilities: During the warranty period, the Contractor is responsible for the following:~~

~~1. Repair or replacement of equipment that fails to function properly due to defective materials or workmanship.~~

~~2. Upon notification by the Engineer of a malfunction, restore the equipment to proper operating condition within 12 hours after notification by the Engineer.~~

~~If the Contractor fails to restore the equipment to proper operating condition within 12 hours after notification, the Engineer has the authority to have the remedial work performed by other forces. The Contractor is responsible for all incurred costs of the work performed by other forces. Remedial work performed by other forces does not alter any of the requirements, responsibilities or obligations of this warranty.~~

~~3. In the event that the equipment does not function or malfunctions due to defective materials or workmanship, the Contractor is liable for any impairment to the safety of pedestrian and vehicular traffic resulting from such malfunction.~~

~~611-5.3 Department's Responsibilities: During the warranty period, the Department is responsible for the following:~~

~~1. Electrical energy costs which are paid for by the local maintaining agency.~~

~~2. All adjustments, such as timing, necessary for the normal operations of equipment.~~

~~3. Documentation of the individuals involved and the time of Contractor notification upon failure or malfunction of equipment.~~

~~4. Repair or replacement of any part of the installation damaged as a result of natural causes or those resulting from vehicular or pedestrian traffic not associated with Contractor activities.~~

After the stand-alone tests have been completed and approved by the Engineer, perform the System Acceptance Test in the presence of the Engineer and, when applicable, a representative of the agency designated to accept maintenance responsibility.

Conduct an approved 30-day System Acceptance Test during which all ITS Systems, Sub-Systems and, at a minimum, all control, monitoring, and communication functions of the field equipment are evaluated from a Transportation Management Center (TMC). Complete the System Acceptance Test documentation and turn them over to the Engineer for approval.

During the 30-day test period, limit device outages to 10% or less, a minimum of a single unit if less than 10 devices or the allowable threshold required in the Contract Documents, whichever is less. Should an outage of more than 10% of the total number of devices occur, a single unit or more if less than 10 devices or the allowable threshold in the Contract Documents, then the System Acceptance Test has failed.

Upon the failure of the System Acceptance Test, the 30-day testing window shall pause until all devices are fully functional. In addition to pausing and extending the test period by the number of days lost by failure and repair time, the Engineer has the option of restarting the full 30-day test.

Upon the successful completion of the System Acceptance Test, the Engineer will submit to the Contractor a letter of approval stating the first and last day of the 30-day system test period.

ARTICLE 611-6 is deleted and the following substituted:

**611-6 ~~Manufacturer's Tests and Certifications~~ Contractor's Warranty Period for Installations.**

~~For materials which may not require formal testing, the Engineer reserves the right to require certifications from the manufacturer of such equipment and material, to the effect that they meet all Specification requirements, and, in the event of questionable equipment or material, to require that such material or equipment be tested at no expense to the Department.~~

~~The Engineer reserves the right to withhold any payments which may be due; if the Engineer determines that the equipment does not meet the Specifications or evaluation criteria.~~

**611-6.1 General Requirements:** Repair or replace any defective components or work of the installations for a 90-day period after final acceptance.

**611-6.2 Contractor's Responsibilities:** During the warranty period, the Contractor is responsible for the following:

1. Repair or replacement of equipment that fails to function properly due to defective materials or workmanship.
2. Upon notification by the Engineer of a malfunction, restore the equipment to proper operating condition within 12 hours after notification by the Engineer.

If the Contractor fails to restore the equipment to proper operating condition within 12 hours after notification, the Engineer has the authority to have the remedial work performed by other forces. The Contractor is responsible for all incurred costs of the work performed by other forces. Remedial work performed by other forces does not alter any of the requirements, responsibilities, or obligations of this warranty.

3. ~~In the event that~~If the equipment does not function or malfunctions due to defective materials or workmanship, the Contractor is liable for any impairment to the safety of pedestrian and vehicular traffic resulting from such malfunction.

**611-6.3 Department's Responsibilities:** During the warranty period, the Department is responsible for the following:

1. Electrical energy costs which are paid for by the local maintaining agency.
2. All adjustments, such as timing, necessary for the normal operations of equipment.
3. Documentation of the individuals involved and the time of Contractor notification upon failure or malfunction of equipment.
4. Repair or replacement of any part of the installation damaged as a result of natural causes or those resulting from vehicular or pedestrian traffic not associated with Contractor activities.

ARTICLE 611-7 is deleted and the following substituted:

**611-7 ~~Contracts for Purchase of Equipment~~ Manufacturer's Tests and Certifications.**

~~611-7.1 Acceptance Tests Required:~~ For each unit of equipment furnished under purchase contracts (furnish only), the Engineer will perform the following tests:

- ~~1. Visual inspection within 5 days after delivery.~~
- ~~2. Operational tests which determine whether the equipment performs in accordance with the requirements of the Contract Documents. The Engineer will complete such tests within 15 days after delivery. If the equipment is listed on the Department's Approved Product List (APL), the Engineer may verify the APL Certification number in lieu of the operational tests.~~

~~611-7.2 Eligibility for Payment:~~

~~The Department will base payment for equipment furnished under purchase contracts on satisfactory completion of the visual inspection and operational tests required by 611-7.1.~~

~~Before any payment will be made for each functional group, deliver to the Engineer and receive from the Engineer acceptance of all units of each functional group of equipment required to be furnished by the Contract Documents. The Department will make separate payment for a staged delivery of each functional group of equipment only when staged delivery is specified in the Contract Documents.~~

~~611-7.3 Equipment Failing to Pass Acceptance Tests:~~

~~When any unit of equipment fails to pass the acceptance tests, correct the deficiencies (by repair or replacement), at no expense (including all freight costs) to the Department, to attain compliance. If the original Contract Time has expired, the Department will charge and continue to assess liquidated damages in accordance with 8-10 until final acceptance of the equipment. Upon compliance with such correction requirements, the Engineer will perform tests on the equipment as specified above and will determine their eligibility for payment.~~

~~The Department will not assess liquidated damages during the acceptance test period in 611-7.1. The Department will allow only one acceptance test exclusion with regard to liquidated damages assessment per lot of units required to be delivered.~~ For materials which may not require formal testing, the Engineer reserves the right to require certifications from the manufacturer of such equipment and material, to the effect that they meet all Specification requirements, and, in the event of questionable equipment or material, to require that such material or equipment be tested at no expense to the Department.

The Engineer reserves the right to withhold any payments which may be due; if the Engineer determines that the equipment does not meet the Specifications or evaluation criteria.

SECTION 611 is expanded by the following new Articles.

**611-~~8~~7 Contracts for Purchase of Equipment.**

**611-~~8~~7.1 Acceptance Tests Required:** For each unit of equipment furnished under purchase contracts (furnish only), the Engineer will perform the following tests:

1. Visual inspection within 5 days after delivery.
2. Operational tests which determine whether the equipment performs in accordance with the requirements of the Contract Documents. The Engineer will complete such

tests within 15 days after delivery. If the equipment is listed on the Department's Approved Product List (APL), the Engineer may verify the APL Certification number in lieu of the operational tests.

**611-87.2 Eligibility for Payment:** The Department will base payment for equipment furnished under purchase contracts on satisfactory completion of the visual inspection and operational tests required by 611-7.1.

Before any payment will be made for each functional group, deliver to the Engineer, and receive from the Engineer acceptance of all units of each functional group of equipment required to be furnished by the Contract Documents. The Department will make separate payment for a staged delivery of each functional group of equipment only when staged delivery is specified in the Contract Documents.

**611-87.3 Equipment Failing to Pass Acceptance Tests:** When any unit of equipment fails to pass the acceptance tests, correct the deficiencies (by repair or replacement), at no expense (including all freight costs) to the Department, to attain compliance. If the original Contract Time has expired, the Department will charge and continue to assess liquidated damages in accordance with 8-10 until final acceptance of the equipment. Upon compliance with such correction requirements, the Engineer will perform tests on the equipment as specified above and will determine their eligibility for payment.

The Department will not assess liquidated damages during the acceptance test period in 611-7.1. The Department will allow only one acceptance test exclusion ~~with regard to~~ regarding liquidated damages assessment per lot of units required to be delivered.

### **611-9 Method of Measurement.**

**611-9.1 General:** Measurement for payment will be in accordance with the following work tasks.

**611-9.2 ITSFM Sub-surface Documentation:** The Contract unit price per mile of documented conduit, cable, boxes, vaults, enclosures, and all other subsurface utilities will include furnishing all hardware, tools, and materials and all data collection, verification, and submission as specified in this Section and the Contract Documents, and all labor, travel, MOT, programs, training, equipment, and other requirements necessary for a complete and accepted documentation submission. Payment for facilities located underground will be based on the linear length of the project as stated in the Contract Documents regardless of the length or number of conduits, cables, enclosures, or other subsurface facilities documented. No allowance will be made for sweeps or vertical distances below the ground.

**611-9.3 ITSFM Location Documentation:** The Contract unit price per location, will include documenting all above ground ITS Facilities at, or associated with, an ITS location as specified in this Section and the Contract Documents, and all labor, travel, training, equipment, programs, MOT, and other requirements necessary for a complete and accepted documentation submission. Payment for location documented will be based on the ITS location including cabinets, poles, utility hardware such as meter cans, utility demarcation sites, disconnects, etc., as well as all ITS devices, auxiliary devices, and other items, attributes, and fields called for in the ITSFM documentation and Contract Documents, regardless of the type or number of devices installed.

### **611-10 Basis of Payment.**

Price and payment will be full compensation for all work costs incurred in submitting ITSFM requirements including, all data gathering, data entry, transportation, protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Item No. 611- 1- ITSFM Sub-surface Documentation – per mile

Item No. 611- 2- ITSFM Location Documentation - each



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

March 1, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **620**  
Proposed Specification: **REVISED 6200207 Grounding and Lightning Protection.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to move the materials section to Section 996 in Division III.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**GROUNDING AND LIGHTNING PROTECTION****(REV ~~211-15-210~~)**

SUBARTICLE 620-2.7 is deleted and the following substituted:

**620-2.7 Surge Protective Devices (SPDs):** ~~Provide SPDs to protect electronics from lightning, transient voltage surges, and induced current.~~

Install SPDs on all power, data, video and any other conductive circuit. SPD requirements for lighting must meet the minimum requirements of Section 992 and the Standard Plans. Use SPDs that meet the requirements of Section 996 and are listed on the Department's Approved Product List (APL). ~~SPDs for traffic control devices, including intelligent transportation system (ITS) equipment, must be listed on the Department's Approved Product List (APL).~~

Provide primary and secondary surge protection on AC power at traffic control device field sites.

SUBARTICLE 620-2.7.1 is deleted and the following substituted:

**620-2.7.1 SPD for 120 Volt or 120/240 Volt Power:** Install a SPD at the utility disconnect to the cabinet. ~~Ensure that the SPD at the utility disconnect includes L-N, L-G, and N-G protection and has a maximum surge current rating of 50 kA per phase or greater. The SPD must meet the requirements of UL 1449, Third Edition and be listed by a NRTL.~~

Ensure an SPD is provided where the supply circuit enters the cabinet. Locate the SPD on the load side of the main disconnect and ahead of any and all electronic devices and connected in parallel with the AC supply. ~~Ensure that the SPD in the cabinet includes L-N, L-G, and N-G protection and has a maximum surge current rating of 50 kA per phase or greater. The SPD must meet the requirements of UL 1449, Third Edition and be listed by a NRTL.~~

~~Ensure that the SPD has a visual indication system that monitors the weakest link in each mode and shows normal operation or failure status and also provides one set of normally open (NO)/normally closed (NC) Form C contacts for remote alarm monitoring. The enclosure for a SPD shall have a NEMA 4 rating.~~

SUBARTICLE 620-2.7.2 is deleted and the following substituted:

**620-2.7.2 SPD at Point of Use:** Install a SPD at the point the ITS devices receive 120 volt power and connected in series with the circuits. ~~Ensure that these devices comply with the minimum functional requirements shown in Table 620-1. Ensure that the units are rated at 15 or 20 amps load and are configured with receptacles.~~

~~Ensure that these units have internal fuse protection and provide common mode (L+N-G) protection.~~

SUBARTICLE 620-2.7.3 is deleted and the following substituted:

**620-2.7.3 SPDs for Low-Voltage Power, Control, Data and Signal Systems:**

Install a specialized SPD on all conductive circuits including, but not limited to, data communication cables, coaxial video cables, and low-voltage power cables. ~~Ensure that these devices comply with the minimum functional requirements shown in Table 620-1 for all available modes (i.e. power L-N, N-G; L-G, data and signal center pin-to-shield, L-L, L-G, and shield-G where appropriate).~~

Circuit Description	Clamping Voltage	Data Rate	Surge Capacity	Maximum Let-Through Voltage
12 V <sub>DC</sub>	15-20 volts	N/A	5kA per mode (8x20- $\mu$ s)	<150 Vpk
24 V <sub>AC</sub>	30-55 volts	N/A	5kA per mode (8x20- $\mu$ s)	<175 Vpk
48 V <sub>DC</sub>	60-85 volts	N/A	5kA per mode (8x20- $\mu$ s)	<200 Vpk
120 V <sub>AC</sub> at POU	150-200 volts	N/A	20kA per mode (8x20- $\mu$ s)	<550 Vpk
Coaxial Composite Video	4-8 volts	N/A	10kA per mode (8x20- $\mu$ s)	<65 Vpk (8x20- $\mu$ s/1.2x50 $\mu$ s; 6kV, 3kA)
RS422/RS485	8-15 volts	Up to 10 Mbps	10kA per mode (8x20- $\mu$ s)	<30 Vpk
T1	13-30 volts	Up to 10 Mbps	10kA per mode (8x20- $\mu$ s)	<30 Vpk
Ethernet Data	7-12 volts	Up to 1 Gbps	1kA per mode (10x1000- $\mu$ s)	<30 Vpk
POE	60-70 volts	Up to 1 Gbps	5kA per mode (8x20- $\mu$ s)	<200Vpk (100kHz 0.5 $\mu$ s; 6kV, 500A)

~~Ensure that SPDs meet the requirements of UL 497B or UL 497C, as applicable, and are listed by a NRTL.~~

SUBARTICLE 620-2.7.4 is deleted:

~~**620-2.7.4 Mechanical Specifications:** Ensure equipment is permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number.~~

~~All parts must be made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal.~~

SUBARTICLE 620-2.7.5 is deleted:

~~620-2.7.5 Environmental Specifications: Ensure that SPDs operate properly during and after being subjected to the temperature and humidity test described in NEMA TS 2, Section 2.2.7, and the vibration and shock tests described in NEMA TS 2, Sections 2.2.8., and 2.2.9.~~

SUBARTICLE 620-2.7.6 is deleted and the following substituted:

**620-2.7.6-4 Manufacturer's Warranty:** Ensure that the SPD has a manufacturer's warranty covering failures for a minimum of 10 years from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608.

The term "failure" for warranty replacement is defined as follows:

Parallel-connected, power-rated SPD units are considered in failure mode when any of the visual indicators shows failure mode when power is applied to the terminals at the unit's rated voltage, or the properly functioning over-current protective device will not reset after tripping.

Series-connected, low-voltage power, data, or signal units are considered in the failure mode when an open circuit condition is created and no data/signal will pass through the SPD device or a signal lead is permanently connected to ground.

In the event that the SPD, including any component of the unit, should fail during the warranty period, the entire SPD shall be replaced by the manufacturer at no cost to the Department or maintaining agency.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 3, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **630**  
Proposed Specification: **6300301 Conduit.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to include intermediate, rigid, and schedule 80 for above ground communication and electrical application. Clarified intermediate metal conduit as being galvanized as well as termination points for local wire.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONDUIT

(REV ~~12-10-210~~)

SUBARTICLE 630-3.1 is deleted and the following substituted:

### 630-3 Installation Requirements.

**630-3.1 General:** Install the conduit in accordance with NEC or National Electrical Safety Code (NESC) requirements and the Standard Plans. Consider the locations of conduit as shown in the Plans as approximate. Construct conduit runs as straight as possible, and obtain the Engineer's approval for all major deviations in conduit locations from those shown in the Plans. Include buried cable warning tape with all trenched conduit. Mark the location of the conduit system with route markers as shown in the Plans and approved by the Engineer. Ensure that all route markers used are new and consistent in appearance.

For conduit installed by directional bore, install in accordance with Section 555. For conduit installed by jack and bore, install in accordance with Section 556.

Use only intermediate galvanized metal conduit, rigid galvanized metal conduit, rigid aluminum conduit or PVC coated intermediate metal conduit for above-ground electrical power service installations and rigid galvanized metal conduit or rigid aluminum conduit for underground electrical power service installations. Meet the requirements of Section 562 for coating all field cut and threaded galvanized pipe.

Use Schedule 80 PVC or fiberglass reinforced epoxy conduit in or on structural elements.

For non-structural, above ground ITS communication and electrical conduit, use intermediate galvanized metal conduit, rigid galvanized metal conduit, or Schedule 80 PVC conduit.

Use HDPE with an SDR number less than or equal to 13.5, Schedule 80 HDPE, Schedule 40 HDPE, Schedule 80 PVC, or Schedule 40 PVC for underground installations of electrical conduit in earth for ITS electrical applications.

Use HDPE with an SDR number less than or equal to 11, Schedule 80 PVC or Schedule 40 PVC for underground installations in earth or concrete for ITS and traffic control signal applications, except, use only HDPE with an SDR number less than or equal to 11 for blown fiber optic cable installations on limited access facilities.

Use HDPE with an SDR number less than or equal to 13.5, Schedule 80 PVC, or Schedule 40 PVC for underground installations of electrical conduit in earth for lighting applications and landscape irrigation applications.

Use HDPE with an SDR number less than or equal to 13.5, Schedule 80 PVC, Schedule 40 PVC, or rigid galvanized metal for underground installations of electrical conduit in concrete for lighting applications.

Use HDPE with an SDR number less than or equal to 11 for directional bores or Schedule 80 PVC for open trenching and conduits serving toll site vehicle detection loop pull boxes. Use the following for all underground toll site applications except for conduits serving vehicle detection loop pull boxes:

1. Rigid steel conduit coated with PVC or a bituminous coating extending 6 inches above finished grade for conduits entering or leaving the ground. Use threaded end and paint all exposed exterior conduit.

2. Rigid galvanized steel elbows and bends for HDPE and PVC conduit raceways longer than 200 feet in length or 2 inches trade size and larger.

Do not place more than the equivalent of three quarter bends or 270 degrees of bends, including the termination bends, between the two points of termination in the conduit, without a pull box. Obtain the Engineer's approval to use corrugated flexible conduits for short runs of 6 feet or less.

When a conduit installation changes from underground to above-ground, make the change a minimum of 6 inches below finished grade.

Install a No. 12 AWG pull wire or polypropylene cord inside the full length of all conduits. Ensure that a minimum of 24 inches of pull wire/cord is accessible at each conduit termination.

Ensure the conduit includes all required fittings and incidentals necessary to construct a complete installation.

When earth backfill and tamping is required, place backfill material as per Section 120 in layers approximately 12 inches thick, and tamp each layer to a density equal to or greater than the adjacent soil.

When backfilling trenches in existing pavement, use a flowable fill meeting the requirements of Section 121.

Provide a standard clearance between underground control cable and electrical service cable or another parallel underground electrical service cable that meets NESC requirements.

Prevent the ingress of water, dirt, sand, and other foreign materials into the conduit prior to, during, and after construction. Seal the ends of conduit after wiring is complete with a moisture resistant sealant that is designed for this specific application.

SUBARTICLE 630-3.7 is deleted and the following substituted:

**630-3.7 Above-Ground Installation:** Use conduit designed and manufactured for use in long-term above-ground applications with UV stabilization to prevent material deterioration. Securely attach above-ground conduit installations to the surface of the supporting structure using conduit straps. As a minimum, use conduit straps located on 5 foot centers. Use galvanized metal conduit straps when installing intermediate galvanized metal conduit, fiberglass reinforced epoxy conduit, rigid galvanized conduit, rigid aluminum conduit or PVC coated intermediate metal conduit above ground.

Use the same PVC coating for the metal straps as the conduit, when using PVC coated intermediate metal conduit.

SUBARTICLE 630-3.9 is deleted and the following substituted:

**630-3.9 Fiber Optic Cable Locate Wire:**

**630-3.9.1 Fiber Optic Cable Locate Wire Installation:** Install locate wire in the trench or bore with all underground conduits to provide end-to-end electrical continuity for electronically locating the underground conduit system. When conduit is placed by trenching, Bury locate wire along the centerline of the top outer surface of installed conduit. Do not install locate wire in a conduit with fiber optic cable.

Do not run locate wires into field cabinets. ~~Terminate locate wires at the first and last pull boxes in the conduit run or as shown in the Plans.~~ Terminate locate wires at the following locations or as shown on the Plans, nearest pull box to a field cabinet, nearest pull box to a building, and splice box locations. Ensure that wire termination occurs in a pull box as shown in Standard Plans, Index 635-001.

In a trenching operation, install the locate wire no more than 3 inches above the conduit. Ensure that the locate wire enters all pull and splice boxes, and that a minimum of 10 feet of slack locate wire is coiled and neatly stored in each box.

In a boring operation, install the locate wire in an encasement, install the conduit detection wire external to the conduit with no separation between conduit and wire, or use conduit with integral locate wire. Locate wire may also be placed in the void between the inner wall of conduit and innerducts contained within the conduit as long as no other cables are present within the void.

~~Perform continuity tests and insulation resistance tests on all locate wires and provide the Engineer with all test results. Replace, or repair defective locate wire at no additional cost.~~

Make locate wire splices in a flush grade-level box. Ensure that locate wire splices are waterproof and suitable for direct burial. Ensure that locate wire splices at the pull box meet NEC requirements. Ensure that locate wire splices are constructed of and in the following order: a mechanical crimp connection with a butt sleeve, an oxide-preventing aerosol lacquer, mastic electrical splicing tape, and standard electrical tape. At the completion of the installation, provide the Engineer with as-built drawings that document all splice locations.

Install WGUs in pull boxes and splice boxes as shown in the Plans or directed by the Engineer. Mount the device in a location high enough from the bottom of the box to allow access to terminal facilities without disturbing cables present within the box. Terminate the locate wires and connect the WGU to ground in accordance with the manufacturer's instructions.

**630-3.9.2 Fiber Optic Cable Locate Wire Testing:** Test the locate wire system after installation to ensure that it functions and can be used to accurately locate the conduit system. Perform continuity tests and insulation resistance tests on all locate wires and provide the Engineer with all test results. Replace, or repair defective locate wire at no additional cost.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

February 23, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **633**

Proposed Specification: **REVISED 6330201 Communication Cable.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to update the fiber optic cable characteristics, performance requirements, connector types, fiber optic jumper description, splice installation, splice testing, and fiber optic cable testing. This proposed spec change is conjunction with Section 7 and 711.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**COMMUNICATION CABLE**(REV ~~12-21-20~~ 2-23-21)

SUBARTICLE 633-2.1.1.1 is deleted and the following substituted:

**633-2.1.1.1 Optical Fiber:** Ensure that the optical fibers used in the cable meet or exceed the Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) TIA/EIA-492-CAAB specification, the U.S. Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900, and International Telecommunication Union ITU-T G.652.D requirements. Use only optical fibers meeting the additional requirements as follows:

Geometry
Cladding Diameter: 125 $\mu$ m, $\pm$ 0.7 $\mu$ m
Core-to-Cladding Concentricity: $\leq$ 0.5 $\mu$ m
Cladding Noncircularity: $\leq$ 0.7%
Mode Field Diameter: 1,550 nm; 10.4 $\mu$ m, $\pm$ 0.5 $\mu$ m
Coating Diameter: 245 $\mu$ m, $\pm$ 5 $\mu$ m
Colored Fiber Nominal Diameter: 250 $\mu$ m $\pm$ 15 $\mu$ m
Optical
Cabled Fiber Attenuation: 1,310 nm, $\leq$ 0. <del>354</del> dB/km; 1,550 nm, $\leq$ 0. <del>253</del> dB/km
Point Discontinuity: 1,310 nm, $\leq$ 0.05 dB/km; 1,550 nm, $\leq$ 0.05 dB/km
Cable Cutoff Wavelength ( $\lambda_{\text{cef}}$ ): $\leq$ 1,260 nm.
<del>Total</del> Dispersion: 1, <del>550</del> <del>625</del> nm $\leq$ <del>1823</del> .0 ps/(nm•km)
Macrobend Attenuation: Turns – 100; Outer diameter (OD) of the mandrel – <del>560</del> mm, $\pm$ 2 mm; $\leq$ 0. <del>035</del> dB at 1,550 nm
<del>Cabled</del> Polarization Mode Dispersion ( $\text{PMD}_Q$ ): $\leq$ 0. <del>045</del> ps/ $\sqrt{\text{km}}$

Ensure that all fiber in the buffer tube is usable fiber that complies with attenuation requirements. Ensure that fibers do not adhere to each other. Ensure that the fiber is free of surface imperfections and inclusions. Ensure that all fiber optic core glass is from the same manufacturer.

SUBARTICLE 633-2.1.1.4 is deleted and the following substituted:

**633-2.1.1.4 Strength Member:** Ensure that the fiber optic cable contains a dielectric central ~~and outside elements that strength member and dielectric outside strength member to~~ prevent buckling of the cable and provide tensile strength. Ensure that the fiber optic cable can withstand a pulling tension of 600 lbs. without damage to any components of the fiber optic cable.

SUBARTICLE 633-2.1.1.6 is deleted and the following substituted:

**633-2.1.1.6 Ripcord:** Ensure that the cable contains at least one ripcord under the sheath or alternate method that allows the removal of the sheath by hand or with pliers. ~~Ensure that the ripcord permits the removal of the sheath by hand or with pliers.~~

SUBARTICLE 633-2.1.1.9.1 is deleted and the following substituted:

**633-2.1.1.9 Performance Requirements:**

**633-2.1.1.9.1 Operating Temperature:** Ensure that the shipping and the operating temperature range of fiber optic cable meets or exceeds minus ~~43~~<sup>40</sup>° to 158° F. Ensure that the installation temperature range of fiber optic cable meets or exceeds minus 22° to ~~158~~<sup>40</sup>°F.

SUBARTICLE 633-2.1.3 is deleted and the following substituted:

**633-2.1.3 Cable Terminations:** Use Type LC connectors for all new network installations. Use Type ST, SC, ~~LC~~, or FC connectors only; for connections to existing equipment or as specified in the Plans or by the Engineer. ~~Ensure that all ST-type fiber optic connectors, whether factory pre-terminated or field installed, are 0.1 inch physical contact with preradiused tips.~~ Ensure that all connectors include a ceramic ferrule and provide a strain relief mechanism when installed on a single fiber cable that contains strength elements. Ensure that ST and FC connectors include a ~~ceramic ferrule and a~~ metallic body, ~~and provide a strain relief mechanism when installed on a single fiber cable that contains strength elements.~~ Ensure that ~~the ST-type all~~ connectors provides a minimum ~~1150~~ pound pullout strength. Ensure that the optical fiber within the body of all connectors is mechanically isolated from cable tension, bending, and twisting.

Ensure that all connectors are compliant with the ~~TIA/EIA-568-A and~~ TIA/EIA-604 standards, as applicable, and are tested according to the Telcordia/Bellcore GR-326-CORE standard. When tested according to the TIA and EIA's Fiber Optic Test Procedure (FOTP)-171 (TIA/EIA-455-171~~B~~) at the manufacturer, ensure that the connectors ~~have test to~~ an average insertion loss, as reflected on the manufacturer data sheet, of less than or equal to ~~0.154~~ decibel and a maximum loss of less than or equal to ~~0.2075~~ decibel. Test the connectors as detailed in FOTP-107 (TIA -455-107A) to reflectance values of less than or equal to minus 50 decibels.

SUBARTICLE 633-2.1.4 is deleted and the following substituted:

**633-2.1.4 Patch Panels:** Ensure that the patch panel is compatible with the fiber optic cable being terminated and color coded to match the optical fiber color scheme. Ensure that the patch panel has a minimum of 12 ~~LCST~~-type panel connectors unless otherwise shown in the Plans. Ensure that the patch panel dimensions do not exceed 14 inches x 6 inches x 4 inches for fiber counts of twelve or less. Ensure the patch panel is suitable for mounting within an approved cabinet at the field device location. Ensure patch panels are sized to accommodate specified

coupler housings and maintain sufficient bend radius for cables. Ensure the patch panel is sized to occupy the minimum space required for capacity.

SUBARTICLE 633-2.1.4.1 is deleted and the following substituted:

**633-2.1.4.1 Pre-terminated Patch Panels:** Ensure that the pre-terminated patch panel includes a factory installed all-dielectric SMF cable stub. Ensure that the panel includes factory installed and terminated LCST-type panel connectors unless otherwise shown in the Plans. Ensure that the cable stub is of sufficient length to splice the stub and provide a fiber connection between the panel and the backbone fiber cable or as directed by the Engineer.

SUBARTICLE 633-2.1.4.2.1 is deleted and the following substituted:

**633-2.1.4.2.1 Connector Panel:** Ensure that the connector panel provides 12 LCST-type, bulkhead-mount coupling connectors unless otherwise shown in the Plans. Ensure that each coupling connector allows connection of a cable terminated on one side of the panel to a cable on the opposite side.

Ensure that each bulkhead-mount coupling connector includes a locknut for mounting the connector in predrilled or punched holes in the connector panel.

ARTICLE 633-2 is expanded by the following new Subarticle:

**633-2.1.5 Fiber Optic Jumper Cables:** Ensure that the fiber optic jumper cables include a factory installed all-dielectric SMF. Ensure that the fiber optic jumper cables include factory installed and terminated LC-type connectors, a connector type shown in the plans, or a connector type directed by the Engineer.

SUBARTICLE 633-2.1.5 is deleted and the following substituted:

**633-2.1.~~65~~ Handling:**

**633-2.1.~~65~~.1 Cable End Sealing:** Ensure that fiber optic cable ends are capped or sealed to prevent the entry of moisture during shipping, handling, storage, and installation. Equip one end of the fiber optic cable with flexible pulling eyes.

**633-2.1.~~65~~.2 Protective Wrap:** Ensure that the fiber optic cable is shipped and stored with a protective wrap or other approved mechanical reel protection device over the outer turns of the fiber optic cable on each reel. Ensure that the wrap is weather resistant and protects the cable reel from environmental hazards. Ensure that the cable reel remains wrapped until cable is to be installed.

**633-2.1.~~65~~.3 Packaging, Shipping and Receiving:** Ensure that the packaging and delivery of fiber optic cable reels comply with the following minimum requirements:

1. Ensure cable is shipped on reels of marked continuous length.

2. Ensure each cable is shipped on a separate, strongly constructed reel designed to prevent damage to the cable during shipment and installation.
3. Ensure each reel has a minimum of 6 feet on each end of the cable available for testing.
4. Ensure that all fiber optic cable is continuous and free from damage.
5. Ensure no point discontinuities greater than 0.1 decibel per reel.
6. Submit the transmission loss test results as required by the TIA-455-61-A standard, as well as results from factory tests performed prior to shipping.
7. Ensure that the manufacturer submits the date of manufacture; product and serial numbers; cable data, including the reel length; refraction index; the project name and location; type of fiber and quantity of strands used; technical product data sheets; and reel numbers.

**633-2.1.76 Manufacturer Testing and Certification:** Submit documentation of all factory tests performed by the manufacturer for all fiber optic cable, splicing material, cable terminations, and patch panels.

SUBARTICLE 633-3.1.5 is deleted and the following substituted:

**633-3.1.5 Fiber Optic Connection - Splicing:** Perform all optical fiber splicing using the fusion splicing technique, and according to the latest version of the manufacturer's cable installation procedures; industry accepted installation standards, codes, and practices; or as directed by the Engineer. Ensure that all splices match fiber and buffer tube colors unless shown otherwise in the Plans. Ensure that splice loss does not exceed a maximum of 0.05 db per splice as measured on the fusion splice machine when splicing newly installed fibers together. Ensure that splice loss does not exceed a maximum of 0.1 db per splice as measured on the fusion splice machine when splicing newly installed fibers to existing fibers. Where a fiber cable is to be accessed for lateral or drop signal insertion, only open the buffer tube containing the fiber to be accessed and only cut the actual fiber to be accessed. If a fiber end is not intended for use, cut the fiber to a length equal to that of the fiber to be used and neatly lay it into the splice tray. Treat any fibers exposed during splicing with a protective coating and place in a protective sleeve or housing to protect the fiber from damage or contaminants. Neatly store all splice enclosures within a splice box. Attach the splice enclosure to the splice box interior wall to prevent the enclosure from lying on the bottom of the splice box. Splices shall be performed only at locations as shown in the plans, or as approved by the Engineer.

SUBARTICLE 633-3.1.8 is deleted and the following substituted:

**633-3.1.8 Installation Testing:** Notify the Engineer of cable testing at least 14 calendar days in advance. Submit the testing procedures to the Engineer for approval prior to commencement of testing. Perform all tests at 1,310 and 1,550 nanometer wavelengths, and include the last calibration date of all test equipment with the test parameters set on the equipment in the test documentation. Ensure that the last calibration date of all test equipment is within the last 12 months and that the calibration certificate is maintained in the test equipment case or provided electronically when requested. Test all installed fibers (terminated and un-

terminated) using methods identified in this Section. All tests must be conducted with a launch box.

Fibers containing splices, fibers terminated on both ends, terminated on one end, or backbone fibers (inside project limits and continuing outside of project limits) must be bidirectionally tested.

Drop fibers without splices (inside project limits and continuing outside of project limits), with only terminations on one end, and bare fiber on the other must be tested unidirectionally at a minimum, unless otherwise specified in the Contract Documents.

Drop fibers without splices which are unterminated on both ends (inside project limits and continuing outside of project limits) must be tested using a bare fiber adapter and tested unidirectionally at a minimum, unless otherwise specified in the Contract Documents.

Present the results of the OTDR testing (i.e., traces for each fiber) and a loss table showing details for each splice and termination tested to the Engineer in an approved electronic format. Ensure all OTDR testing complies with the EIA/TIA-455-61 standard.

SUBARTICLE 633-3.1.8.1 is deleted and the following substituted:

#### **633-3.1.8.1 Optical Time Domain Reflectometer (OTDR) Attenuation**

**Testing:** Perform testing on all fibers to ensure that attenuation does not exceed allowable loss (0.~~354~~ db/km for 1310 nanometer wavelength, 0.~~253~~ db/km for 1550 nanometer wavelength, plus 0.5 db for any connectors and 0.1 db for splices). Repair or replace cable sections exceeding allowable attenuation at no cost to the Department.

SUBARTICLE 633-3.1.8.2 is deleted and the following substituted:

~~633-3.1.8.1.12~~ OTDR Tracing: Test all fibers ~~from both cable end points~~ with an optical time domain reflectometer (OTDR) at wavelengths of 1310 and 1550 nanometer. ~~Test the fibers that are not terminated at the time of installation using a bare fiber adapter. Present the results of the OTDR testing (i.e., traces for each fiber) and a loss table showing details for each splice or termination tested to the Engineer in an approved electronic format. Ensure all OTDR testing complies with the EIA/TIA-455-61 standard.~~

SUBARTICLE 633-3.1.8.3 is deleted and the following substituted:

~~633-3.1.8.1.23~~ Splice Loss Testing: Ensure that the splice loss for a SMF fusion splice does not exceed a maximum bidirectional average of 0.1 decibel per splice when measured using an OTDR. Repair or replace splices that exceed allowable attenuation at no cost to the Department.

SUBARTICLE 633-3.1.8.4 is deleted and the following substituted:

~~633-3.1.8.1.34~~ Connector Loss Testing: Ensure that the attenuation in the connector at each termination panel and its associated splice does not exceed

0.65 decibel when measured using an OTDR. Repair or replace connectors exceeding allowable attenuation at no cost to the Department.

SECTION 633 is expanded by the following new Article:

**633-5 Fiber Optic Cable Locator.**

Locate and mark all existing Department owned or maintained fiber optic facilities within project limits prior to performing any subsurface work.

Locate and mark as necessary to ensure that all fiber optic facilities are located and visibly marked at all times.

ARTICLE 633-5 is deleted and the following substituted:

**633-65 Method of Measurement.**

The quantities to be paid will be: the length, in feet, of fiber optic cable; the number, per each, of fiber optic connections; the number, per each, of fiber optic connection hardware; the number, per day, of fiber optic cable locator; and the length, per foot, of twisted pair cable, accepted by the Engineer.

The Contract unit price for communication cable, furnished and installed, will include furnishing, placement, and testing of all material, and for all tools, labor, equipment, installation hardware (such as support wire, cable ties, cable clamps, and lashing wire), supplies, support, personnel training, documentation, and incidentals necessary for a complete installation.

Payment for conductive cable terminal connectors and conductive cable grounding is considered incidental and shall be included in the price for twisted pair communication cable.

Fiber optic splices and terminations, as shown in the Plans, shall be measured per each fiber optic connection furnished and installed.

The price per day for a Fiber Optic Cable Locator, will include all tools, labor, equipment, locating and marking hardware (such as flags, paint, and shovels), supplies, support, personnel training, documentation, and incidentals.

ARTICLE 633-6 is deleted and the following substituted:

**633-76 Basis of Payment.**

Prices and payments will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 633- 1	Fiber Optic Cable - per foot.
Item No. 633- 2	Fiber Optic Connection - each.
Item No. 633- 3	Fiber Optic Connection Hardware - each.
Item No. 633- 4	Twisted Pair Cable - per foot.
<u>Item No. 633- 6</u>	<u>Fiber Optic Locator - per day.</u>



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 3, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **635**  
Proposed Specification: **6350202 Pull, Splice, and Junction Boxes.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations to move the material language to Division III Section 996.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PULL, SPLICE, AND JUNCTION BOXES**(REV ~~211-14-210~~)

SUBARTICLE 635-2.2.1 is deleted and the following substituted:

**635-2.2 Pull and Splice Boxes:**

**635-2.2.1 General:** ~~Manufacturers of concrete pull and splice boxes and covers seeking inclusion on the APL shall meet the requirements of Section 105 and this Section and be listed on the Department's Production Facility Listing.~~

~~\_\_\_\_\_~~ Use only boxes that meet the requirements of Section 996 and are listed on the Department's Approved Product List (APL). Ensure box bodies and covers are free of flaws such as cracks, sharp, broken, or uneven edges, and voids.

Ensure in-ground boxes have an open bottom design.

SUBARTICLE 635-2.2.2 is deleted and the following substituted:

**635-2.2.2 Marking:** Mark boxes in accordance with 996-5. ~~Ensure the following information is permanently cast or engraved into the top surface of all pull and splice box covers. If used, identification plates must be UV stable, mechanically fastened, and bonded with adhesive material suitable for outdoor applications~~

~~\_\_\_\_\_~~ 1. ~~Unless otherwise shown in the Plans, mark application as follows:~~

~~\_\_\_\_\_~~ ~~FDOT TRAFFIC SIGNAL for signalized intersections~~

~~\_\_\_\_\_~~ ~~FDOT FIBER OPTIC CABLE for fiber optic cable~~

~~\_\_\_\_\_~~ ~~FDOT LIGHTING for highway lighting~~

~~\_\_\_\_\_~~ ~~FDOT TRAFFIC MONITORING for traffic monitoring~~

~~\_\_\_\_\_~~ ~~FDOT ELECTRICAL for other electrical applications~~

~~\_\_\_\_\_~~ 2. ~~Manufacturer's name or logo~~

~~\_\_\_\_\_~~ 3. ~~FDOT APL approval number~~

~~\_\_\_\_\_~~ 4. ~~TIER rating~~

~~\_\_\_\_\_~~ ~~Ensure the date of manufacture (month/day/year, or date code) is permanently located on the top or bottom of the cover. Ensure the interior of the box body has a permanent marking that includes the manufacturer part/model number and date of manufacture near the top of box in a location that is visible after installation when the cover is removed.~~

SUBARTICLE 635-2.2.3 is deleted and the following substituted:

**635-2.2.3 Dimensions:** Unless otherwise shown in the Plans, provide pull and splice boxes with ~~the following~~ dimensions in accordance with 996-5.

~~\_\_\_\_\_~~ ~~For signalized intersection and lighting applications, provide pull boxes with nominal cover dimensions of 13 inches wide by 24 inches long or larger and no less than 12 inches deep. Ensure the inside opening area is a minimum of 240 square inches and no inside dimension is less than 12 inches.~~



~~\_\_\_\_\_ For fiber optic cable applications, provide pull boxes with nominal cover dimensions of 24 inches wide by 36 inches long or larger and no less than 24 inches deep.~~

~~\_\_\_\_\_ Provide rectangular splice boxes with nominal cover dimensions of 30 inches wide by 60 inches long or larger and no less than 36 inches deep. Provide round splice boxes with a nominal cover diameter of 36 inches or larger and no less than 36 inches deep.~~

SUBARTICLE 635-2.2.4 is deleted:

~~\_\_\_\_\_ **635-2.2.4 Fabrication:** Provide box covers constructed of concrete, polymer concrete or other materials meeting the requirements of this Section.~~

~~\_\_\_\_\_ Provide box covers with lifting slots and a flush-seating lockdown mechanism. Use penta head or other non-standard, security type lockdown lag bolts. Ensure lockdown bolts and lifting slots are Type 316, 304, or 302 passivated stainless steel or brass. Ensure lockdown bolt assembly is designed to prevent seizing and can be removed without damaging the cover or box body. Ensure the lockdown bolt threaded insert/nut assembly is field replaceable.~~

SUBARTICLE 635-2.2.5 is deleted:

~~\_\_\_\_\_ **635-2.2.5 Testing Requirements:** Ensure pull and splice boxes meet the American National Standards Institute/Society of Cable Telecommunications Engineers (ANSI/SCTE) 77-2017 Specification for Underground Enclosure Integrity for TIER 15 loading with the following additional clarifications and requirements:~~

~~\_\_\_\_\_ 1. Apply all environmental tests to the box and its cover.~~

~~\_\_\_\_\_ 2. All flexural testing must be conducted in accordance with an appropriate ASTM standard and clearly stated in the report.~~

~~\_\_\_\_\_ 3. Perform repetitions of Cycle 1 in Table X2.1 of ASTM G154 for a minimum duration of 1000 hours for the simulated sunlight exposure test.~~

~~\_\_\_\_\_ 4. Use deflection measuring devices positioned to measure vertical and lateral deflection (wherever maximum deflection occurs) for the vertical sidewall load test.~~

~~\_\_\_\_\_ 5. Conduct the lateral sidewall pressure, vertical sidewall load and cover vertical load tests without any removable or permanent wall to wall supporting beams located in the interior or top of the box opening.~~

~~\_\_\_\_\_ When testing pull and splice boxes of various sizes (width x length x depth), the cover impact test, internal equipment protection test, coefficient of friction test, and all environmental tests, can be completed using a single representative box/cover (instead of samples from all box/cover sizes) as long as the test report indicates the following:~~

~~\_\_\_\_\_ 1. Materials of construction, compositions, and manufacturing processes are identical for all box and cover sizes submitted for listing on the APL.~~

~~2. Size (width x length x depth) of the representative  
box/cover.~~

SUBARTICLE 635-3.1 is deleted and the following substituted:

**635-3 Installation.**

**635-3.1 General:** Do not install power and communication cables in the same box unless otherwise shown in the Plans.

When signal or 120 volt (or greater) power is present, ground all metal covers in accordance with Section 620.

Ensure metal junction boxes are grounded and bonded in accordance with the NEC Section 314.4.



*Florida Department of Transportation*

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GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

February 4, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **641**  
Proposed Specification: **REVISED 6410202 Prestressed Concrete Poles.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to remove the following material and installation language from Division II to Section 996 in Division III.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PRESTRESSED CONCRETE POLES**(REV ~~211-34-210~~)

SUBARTICLE 641-2.2 is deleted and the following substituted:

**641-2.2 Camera Lowering Device:** Use lowering devices that meet the requirements of Section 996 and are listed on the Department's Approved Product List (APL). Permanently mark the lowering device with manufacturer name or trademark, model or part number, date of manufacture, and serial number.

~~—————The lowering device must provide the electrical connection between the control cabinet and the equipment installed on the lowering device without reducing the function or effectiveness of the equipment. The lowering device system support arm must be capable of withstanding service tension and shear up to 1 kip minimum.~~

~~—————The lowering device must include a disconnect unit and power, data, and video cables (as applicable) for connecting equipment, a divided support arm, pole attachment provisions, a rotatable pole top tenon, and a pole top junction box, unless otherwise shown in the Plans.~~

~~—————All external components are to be made of corrosion-resistant materials that are powder coated, galvanized, or otherwise protected from the environment. All finished castings must have a smooth finish free from cracks, blow holes, shrinks, and other flaws. All roller fairlead frames must be corrosion-resistant stainless steel or aluminum. All pulleys used in the lowering device and portable lowering tool must have sealed, self-lubricated or oil-tight bearings, or sintered bronze bushings.~~

~~—————Provide a minimum of 100 feet of composite power and signal cable prewired to the lowering device at the factory unless otherwise shown in the Plans. Splices will not be allowed.~~

~~—————Use only lowering devices designed to withstand the design wind speeds defined in the Department's Structures Manual.~~

SUBARTICLE 641-2.2.1 is deleted:

~~**641-2.2.1 Equipment Connection Box:** Include a 1-1/2 inch National Pipe Thread (NPT) pipe connection point for attaching a camera. Ensure that the equipment connection box has an ingress protection rating of no less than IP55.~~

SUBARTICLE 651-2.2.2 is deleted:

~~**641-2.2.2 Disconnect Unit:** The disconnect units must have a minimum load capacity of 600 pounds with a 4:1 safety factor and be capable of securely holding the lowering device and any installed equipment. Fixed and movable components of the disconnect unit must have a locking mechanism between them, with at least two mechanical latches for the movable assembly. The fixed unit must have a heavy-duty cast tracking guide that allows latching in the same position each time. The load must be transferred from the lowering cable to the mechanical~~

~~latches when the system is in the latched position. Interface and locking components must be constructed of stainless steel or aluminum.~~

SUBARTICLE 641-2.2.2.1 is deleted:

~~**641-2.2.2.1 Disconnect Unit Housing:** The disconnect unit housing must be weather proof with an ingress protection rating of no less than IP55.~~

SUBARTICLE 641-2.2.2.2 is deleted and the following substituted:

~~**641-2.2.2.2.1 Connector Block:** Provide modular, self-aligning and self-adjusting female and male socket contact halves in the connector block. Equip the lowering device with enough contacts to permit operation of all required functions of the camera, up to a maximum of 20 contacts and include at least two spare contacts. Provide contact connections between the fixed and movable lowering device components that are capable of passing EIA-232, EIA-422, EIA-485, and Ethernet data signals and 1 volt peak to peak (V<sub>p-p</sub>) video signals, as well as 120 V<sub>AC</sub>, 9-24 V<sub>AC</sub>, and 9-48 V<sub>DC</sub> power. The lowering device connections must be capable of carrying the signals, voltages, and current required by the devices connected to them under full load conditions.~~

~~Use only corrosion resistant stainless steel hardware. Lubricate all components, including the connector block and contacts, in accordance with the manufacturer's recommendations. Ensure that male contacts used for grounding mate first and break last. All contacts and connectors must be self-aligning and self-adjusting mechanical systems. Provide a spring assisted contact assembly to maintain constant pressure on the contacts when the device is in the latched position.~~

~~Provide connector pins made of brass or gold plated nickel, or gold plated copper.~~

~~Ensure that the current carrying male and female contacts are a minimum of 0.09 inch in diameter and firmly affixed to the connector block. Ensure mated connectors do not allow water penetration.~~

SUBARTICLE 641-2.2.3 is deleted and the following substituted:

~~**641-2.2.3.2 Lowering Tool:** Provide a portable metal frame lowering tool manufactured of corrosion resistant materials with winch assembly and a cable with a combined weight less than 35 lbs that is capable of securely supporting itself and the load. The lowering tool must include a quick release cable connector, and a torque limiter that will prevent over-tensioning of the lowering cable and be equipped with gearing that reduces the manual effort required to operate the lifting handle to raise and lower a capacity load. Ensure that the lowering tool can be powered using a 1/2 inch chuck, variable-speed reversible industrial duty electric drill capable of matching the manufacturer recommended revolutions per minute. Provide an adapter with a clutch mechanism and torque limiter for use with the drill.~~

~~The winch assembly must have a minimum drum size width of 3.75 inches and a positive braking mechanism to secure the cable reel during raising and lowering~~

~~operations, and to prevent freewheeling. The lowering cable must wind evenly on the winch drum during operation. Provide a manual winch handle that incorporates a non-shear pin type torque limiter that can be used repeatedly and will not damage the lowering system.~~

~~\_\_\_\_\_ Provide a minimum of one lowering tool and any additional tools as required in the Plans. Deliver the lowering tool to the Department before final acceptance.~~

~~\_\_\_\_\_ **641-2.2.4 Lowering Cable:** The lowering cable must be 0.125 inch minimum diameter Type 316 stainless steel aircraft cable (7 strands x 19 gauge) with a minimum breaking strength of 1,760 pounds. Additionally, the lowering cable assembly (as installed with thimble and crimps on one end and a cable clamp inside the latch on the lowering device end), must have a minimum breaking strength of 1,760 lbs.~~

~~\_\_\_\_\_ All lowering cable accessories, such as connecting links, must have a minimum workload rating that meets or exceeds that of the lowering cable.~~

~~\_\_\_\_\_ Prefabricated components for the lift unit support system must prevent the lifting cable from contacting the power or video cables.~~

SUBARTICLE 641-2.2.5 is deleted and the following substituted:

**641-2.2.5-3 Wiring:** All wiring must meet NEC requirements and be installed in accordance with the equipment manufacturers' recommendations for each device connected on the pole, at the lowering device, and in the field cabinet.

SUBARTICLE 641-2.2.6 is deleted and the following substituted:

**641-2.2.6-4 External-Mount Lowering System Enclosure for Mounting to Existing Structures:** ~~The system must include an upper mounting/junction box, winch assembly and all external conduit and cabling necessary for mounting to existing structures.~~

~~\_\_\_\_\_ Provide a NEMA 4 rated lower lockable pole-mounted cabinet, constructed of corrosion resistant 5052 sheet aluminum with a minimum thickness of 1/8 inch, to house the winch assembly. The cabinet must allow for unobstructed operation of the winch, access for servicing and provide sufficient clear area for operation of the winch manually and with an electric drill. The outside surface of the cabinet must have a smooth, uniform natural aluminum finish. All inside and outside edges of the winch cabinet must be free of burrs, and all welds must be neatly formed, free of cracks, blow holes, and other irregularities. Cabinet hinges must be vandal resistant and constructed of 14 gauge stainless steel or 1/8 inch aluminum with stainless steel hinge pins.~~

~~\_\_\_\_\_ The cabinet door must be double-flanged and include neoprene closed-cell gaskets permanently secured on the interior door surfaces that contact the door opening. The cabinet door must not sag. Include a pin tumbler lock keyed for use with a No. 2 key and two keys, unless otherwise directed by the Plans. The cabinet door handle must include a lock hasp that will accommodate a padlock with a 7/16 inch diameter shackle.~~

~~\_\_\_\_\_ The upper mounting/junction box must include a maintenance access door with captive attachment hardware. Provide all necessary mounting hardware, conduits, standoffs, and conduit mounts required for a complete and functional system.~~

~~\_\_\_\_\_ The external conduit must be galvanized Schedule 40 with National Pipe Thread Taper (NPT) threads and have a minimum ID of 3 inches at the lower winch cabinet~~

entrance and allow the lowering cable to wind evenly on the winch drum without binding. All conduit couplings and connections between the pole-mounted cabinet and upper mounting/junction box must be watertight.



*Florida Department of Transportation*

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GOVERNOR

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **646**  
Proposed Specification: **6460100 Aluminum Poles, Pedestals, and Posts.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the State Construction Office to include painted aluminum poles, pedestals, and posts to the warranty.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## ALUMINUM POLES, PEDESTALS, AND POSTS (REV 12-10-20)

ARTICLE 646-1 is deleted and the following substituted:

### 646-1 Description.

The work in this Section consists of furnishing and installing aluminum poles, pedestals, and posts at the locations shown in the Plans and in accordance with the details shown in the Plans and Standard Plans, subject to a five-year warranty period as defined herein. The warranty period will apply only when aluminum poles, pedestals, and posts are painted as called for in the Contract Documents. An aluminum pedestal consists of a pole and a transformer base.

ARTICLE 646-2 is expanded by the following new Subarticle:

### 646-2 Materials.

**646-2.1 Poles and Posts:** Use nominal 4 inch diameter Schedule 40 aluminum poles and posts meeting the requirements of The Aluminum Association Alloy 6061-T6 and ASTM B429. Poles used with transformer bases must be threaded with No. 8 NPT threads. Sufficient threads are required to fully seat the pole into the hub of the pedestal base.

**646-2.2 Transformer Base:** Use transformer bases listed on the Department's Approved Product List (APL).

Manufacturers seeking APL approval of proprietary transformer bases must submit an application in accordance with Section 6, independent laboratory test report, and calculations and drawings showing details, notes, materials, dimensions, and sizes that the transformer base meets the following requirements:

1. Materials: Meets the material requirements of Aluminum Association Alloy 319 or 356-T6 and ASTM B26 or ASTM B108.
2. Height: Base is 12 to 18 inches in height with a threaded hub at the top for mounting a nominal 4 inch Schedule 40 aluminum pole. The threaded hub must be tapped to allow full pole engagement.
3. Fastening: Provides for fastening to a foundation with four 3/4 inch anchor bolts located 90 degrees apart. The bolt circle diameter must be in accordance with the base manufacturer recommendations. The base design must allow for bolts that are placed off-center.
4. Door: Provides a door opening of not less than 8 inches by 8 inches. The door must be constructed of fiberglass or other non-combustible, non-aluminum material. Attach the door to the base with cleats and one stainless steel socket button head screw or by other means suitable for NEMA 3 electrical enclosures.
5. Moment Capacity: Supports an ultimate moment capacity of 10,000 foot-pounds. Submit certified test reports from the manufacturer verifying that each base model meets the moment capacity without breaking, cracking or rupturing in any manner.
6. Breakaway: Meets the requirements in the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Submit the FHWA certification for product approval.

7. Identification: Is legibly and visibly marked with the manufacturer's name or logo and the model number.

**646-2.3 Anchor Bolts:** Provide ASTM F1554 Grade 55 anchor bolts, 3/4 inch diameter, 18 inches long, with double nuts per ASTM F1554 Grade 55. For each bolt, provide two 3/4 inch ASTM A563 Grade A or higher heavy hex nuts and one 3/16 inch thick by 3 inch round ASTM A36 plate washer or one ASTM F436 Type 1 washer. Anchor bolts, washers and hex nuts must be galvanized in accordance with ASTM F2329.

**646-2.4 End Caps:** Provide end caps sized for nominal 4 inch diameter Schedule 40 aluminum poles. The cap must be a minimum of 1/4 inch thick and tapped for at least two set screws. Set screws will be provided with the end cap.

**646-2.5 Shims:** Provide U-shaped galvanized steel shims 2 inches wide by 2-1/2 inches long, shaped to fit around a 3/4 inch anchor bolt.

**646-2.6 Concrete:** Use Class 1 concrete meeting the requirements of Section 346.

**646-2.7 Painting:**

**646-2.7.1 General:** When required by the Contract Documents, provide painted aluminum poles, pedestals, and posts. Provide products that will meet specification requirements throughout the warranty period. Meet the color requirement as specified in the Contract Documents. Provide the Engineer with two metal sample coupons, a minimum of 2 inches by 4 inches, painted concurrently and with the same paint as was used on the first lot of any aluminum poles, pedestals, and posts delivered to the jobsite. Submit sample coupons and manufacturer product data sheets to the Engineer along with the delivery of the first shipment of any painted aluminum poles, pedestals, and posts delivered to the jobsite. At the time of their delivery, the sample coupons described in this paragraph must match the color of the aluminum poles, pedestals, and posts to within 1ΔE measured as specified in 975-4. If the delivered sample coupons exhibit a difference in color from the poles, pedestals, and posts greater than 1ΔE then the sample coupons will be considered unacceptable and no payment shall be made for the materials which the sample coupons represent. Those materials shall not be accepted by the Department until acceptable representative sample coupons in accordance with the requirements of this Section have been submitted to the Engineer.

**646-2.7.2 Responsible Party Warranty:** When the Contract Documents call for painted aluminum poles, pedestals, and posts, the Contractor shall designate a responsible party to accept responsibility. The responsible party designated by the Contractor must execute and submit to the Department a form, provided by the Department, prior to the first delivery to the jobsite of any painted aluminum poles, pedestals, and posts, stipulating that the responsible party accepts responsibility for ensuring the coating system adhesion and color retention requirements as specified in 975-4 are met for a period of five years after final acceptance in accordance with 5-11. The responsible party shall also bear the continued responsibility for performing all remedial work associated with repairs of any adhesion or color retention failure as defined in Section 975, as to which notice was provided to the responsible party within the five year warranty period. Failure to timely designate the responsible party will result in the Contractor being the responsible party unless otherwise agreed to in writing by the Department. The responsible party shall be either the Contractor or the supplier of the painted aluminum poles, pedestals, and posts. When the responsible party is the fabricator, the responsible party shall be one of the fabricators listed on the Prequalified Painted Galvanized Steel and Aluminum Products Fabricators List. This list may be viewed on the Department's website at the following URL: <https://www.fdot.gov/construction/Engineers/PaintedPoleSuppliers.shtm>

Upon final acceptance of the Contract in accordance with 5-11, the Contractor's responsibility to ensure that the coating system adhesion and color retention requirements specified in 975-4 will terminate. The obligations of the responsible party set forth in this Section shall start at final acceptance of the Contract in accordance with 5-11 and continue thereafter until expiration of the five-year warranty period.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **649**  
Proposed Specification: **6490403 Galvanized Steel Poles, Mast Arms, and Monotube Assemblies.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the State Construction Office to modify the name of the Prequalified Fabricators List that include aluminum products.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GALVANIZED STEEL POLES, MAST  
ARMS, AND MONOTUBE ASSEMBLIES  
(REV 11-12-20)**

SUBARTICLE 649-4.3.1 is deleted and the following substituted:

**649-4.3 Painting:**

**649-4.3.1 General:** When required by the Contract Documents, provide painted poles, mast arms and monotube assemblies. Provide products from a fabricator on the Department's list of [Prequalified Painted Galvanized Steel and Aluminum Products Fabricators List](#)~~Prequalified Fabricators of Painted Galvanized Steel Strain Poles, Mast Arms and Monotube Assemblies~~. Provide products that will meet specification requirements throughout the warranty period. Meet the color requirement as specified in the Contract Documents. Provide the Engineer with two metal sample coupons, a minimum of 2 inches by 4 inches, painted concurrently and with the same paint as was used on the first lot of any poles, mast arms and monotube assemblies delivered to the jobsite. Submit sample coupons and manufacturer product data sheets to the Engineer along with the delivery of the first shipment of any painted poles, mast arms or monotube assemblies delivered to the jobsite. At the time of their delivery, the sample coupons described in this paragraph shall match the color of the poles, mast arms and monotube assemblies to within 1ΔE when measured as specified in 975-4. The Engineer will perform a visual color comparison between the delivered products and sample coupons. The Engineer may evaluate and document any color difference by measuring as specified in 975-4. If the delivered sample coupons exhibit a difference in color from the poles, mast arms and monotube assemblies greater than 1ΔE then the sample coupons will be considered unacceptable and no payment shall be made for the materials which the sample coupons represent. Those materials shall not be accepted by the Department until acceptable representative sample coupons in accordance with the requirements of this Section have been submitted to the Engineer.

SUBARTICLE 649-4.3.2. is deleted and the following substituted:

**649-4.3.2 Responsible Party Warranty:** When the Contract Documents call for painted galvanized steel poles, mast arms or monotube assemblies, the Contractor shall designate a responsible party to accept responsibility. The responsible party designated by the Contractor must execute and submit to the Department a form, provided by the Department, prior to the first delivery to the jobsite of any painted poles, mast arms or monotube assemblies, stipulating that the responsible party accepts responsibility for ensuring the coating system adhesion and color retention requirements as specified in 975-4 are met for a period of five years after final acceptance in accordance with 5-11. The responsible party shall also bear the continued responsibility for performing all remedial work associated with repairs of any adhesion or color retention failure as defined in Section 975, as to which notice was provided to the responsible party within the five year warranty period. Failure to timely designate the responsible party will result in the Contractor being the responsible party unless otherwise agreed to in writing by the Department. The responsible party shall be either the Contractor or the fabricator. When the responsible party is the fabricator, the responsible party shall be one of the fabricators listed on the [Prequalified Painted Galvanized Steel and Aluminum Products Fabricators List](#)~~Prequalified~~

~~Fabricators of Painted Galvanized Steel Strain Poles, Mast Arms and Monotube Assemblies.~~

This list may be viewed on the Department's website at the following URL:

<https://www.fdot.gov/construction/Engineers/PaintedPoleSuppliers.shtm>

Upon final acceptance of the Contract in accordance with 5-11, the Contractor's responsibility to ensure that the coating system adhesion and color retention requirements specified in 975-4 will terminate. The obligations of the responsible party set forth in this Section shall start at final acceptance of the Contract in accordance with 5-11 and continue thereafter until expiration of the five year warranty period.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

February 3, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **654**  
Proposed Specification: **6540201 Midblock Crosswalk Enhancement Assemblies.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to clarify passive detection allowed for actuation.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## MIDBLOCK CROSSWALK ENHANCEMENT ASSEMBLIES (REV 11-12-20)

SUBARTICLE 654-2.1 is deleted and the following substituted:

**654-2.1 In-Roadway Light Assemblies:** In-roadway light assemblies must meet the physical and operational requirements of the latest edition of the MUTCD, Chapter 4N.

~~In-roadway light assemblies shall be normally dark, initiate operation only upon pedestrian actuation via a pedestrian pushbutton.~~ In-roadway light assemblies can include a passive detector in addition to a pedestrian pushbutton. In-roadway light assemblies must be normally dark and initiate operation upon pedestrian actuation via a pedestrian pushbutton or a passive detector. The In-roadway light assembly willand cease operation at a predetermined time after the pedestrian actuation. ~~or, with passive detection, after~~ If a passive detector is used, the In-roadway light assembly may cease operation after the pedestrian clears the crosswalk. The duration of the predetermined period shall be programmable and capable of matching the pedestrian clearance time for pedestrian signals as determined by MUTCD procedures. The timer that controls flashing must automatically reset each time a pedestrian call is received.

In-roadway light assemblies must have a minimum luminance of 101 candelas and a minimum viewing angle of 20 degrees.

SUBARTICLE 654-2.2.2 is deleted and the following substituted:

**654-2.2.2 Beacon Flashing Requirements:** The light intensity of the yellow indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 for Class 1 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005. Ensure RRFB assemblies are capable of automatically dimming to reduce brightness of the LEDs at nighttime.

The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, shall not be between 5 and 30 flashes per second. When activated, the two yellow indications in each RRFB shall have a flash rate of 75 flash cycles per minute using the following sequence: left side beacon on for 50 milliseconds (msec), both beacons off for 50 msec, right side beacon on for 50 msec, both beacons off for 50 msec, left side beacon on for 50 msec, both beacons off for 50 msec, right side beacon on for 50 msec, both beacons off for 50 msec, both beacons on for 50 msec, both beacons off for 50 msec, both beacons on for 50 msec, both beacons off for 250 msec. No other flash patterns shall be selectable via hardware or software.

SUBARTICLE 654-2.2.3 is deleted and the following substituted:

**654-2.2.3 RRFB Operation:** RRFB can include a passive detector in addition to a ~~shall be normally dark, initiate operation only upon~~ pedestrian pushbutton. RRFBs must be normally dark and initiate operation only upon pedestrian actuation via a pedestrian pushbutton, or a passive detector. The RRFB willand cease operation at a predetermined time after the pedestrian actuation. ~~or, with passive detection, after~~ If the passive detector is used, the RRFB



may cease operation after the pedestrian clears the crosswalk. The duration of the predetermined period shall be programmable and capable of matching the pedestrian clearance time for pedestrian signals as determined by MUTCD procedures. The timer that controls flashing must automatically reset each time a pedestrian call is received.

All RRFBs associated with a single crosswalk (including those with an overhead or advance crossing sign, if used) shall simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.

RRFBs must include an instruction sign (FTP-68C-21)~~with the legend~~  
~~PUSH BUTTON TO TURN ON WARNING LIGHTS~~ mounted adjacent to or integral with each pedestrian pushbutton.

A confirmation light directed at and visible to pedestrians in the crosswalk must be installed integral to the RRFB to give confirmation that the RRFB is in operation.

ARTICLE 654-6 is deleted and the following substituted:

**654-6 Basis of Payment.**

Price and Payment will be full compensation for all work specified in this Section.

Payment will be made under:

- |               |   |  |
|---------------|---|--|
| Item No. 654- | 1 | <u>Midblock Crosswalk</u> - In-Roadway Light Assembly - per assembly.                  |
| Item No. 654- | 2 | <u>Midblock Crosswalk</u> - Rectangular Rapid Flashing Beacon Assembly - per assembly. |
| Item No. 654- | 3 | <u>Midblock Crosswalk</u> - Pedestrian Hybrid Beacon Assembly - per assembly.          |



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **660**  
Proposed Specification: **6600202 Vehicle Detection System.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to distinguish the presence detection and introduce new pay items between both functions. The proposed spec change is in accordance with Section 611.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## VEHICLE DETECTION SYSTEM (REV 11-12-20)

SUBARTICLE 660-2.2.2.2 is deleted and the following substituted:

**660-2.2.2.2 Video:** A video vehicle detection system (VVDS) uses one or more cameras recommended by the manufacturer or an integrated thermal sensor and video analytics hardware and software to detect vehicle presence, provides a detection output, ~~or~~ generates volume, occupancy, and speed data.

SUBARTICLE 660-2.2.2.3 is deleted and the following substituted:

**660-2.2.2.3 Microwave:** A microwave vehicle detection system (MVDS) transmits, receives, and analyzes a FCC-certified, low-power microwave radar signal to detect vehicle presence, provide a detection output, ~~or~~ generate volume, occupancy, and speed data.

SUBARTICLE 660-4.2.2 is deleted and the following substituted:

**660-4.2.2 Field Acceptance Testing:** ~~Verify detector data accuracy at installed field sites using a reduced method similar to those described in 995-2.9.1. Compare sample data collected from the detection system with ground truth data collected by human observation. For site acceptance tests, collect samples and ground truth data for each site for a minimum of five minutes during a peak period and five minutes during an off peak period. Perform site acceptance tests in the presence of the Engineer.~~ Conduct field acceptance testing in accordance with Section 611.

ARTICLE 660-7 is deleted and the following substituted:

### **660-7 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section. Payment will be made under:

Item No. 660-1	Inductive Loop Detector – each.
Item No. 660-2	Loop Assembly – per assembly.
Item No. 660-3	Vehicle Detection System - Microwave – each.
Item No. 660-4	Vehicle Detection System – Video – each.
Item No. 660-5	Vehicle Detection System – Wireless Magnetometer – each.
Item No. 660-6	Vehicle Detection System - AVI – each.
Item No. 660-7	Vehicle Detection System - WWVDS – each.
<u>Item No. 660-8</u>	<u>Traffic Data Detection System - Microwave - each.</u>
<u>Item No. 660-9</u>	<u>Traffic Data Detection System - Video - each.</u>



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **682**  
Proposed Specification: **6820104 Video Equipment.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to provide guidance on field acceptance testing with Section 611.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## VIDEO EQUIPMENT (REV 11-12-20)

SUBARTICLE 682-1.4 is deleted and the following substituted:

### **682-1.4 Field Acceptance Testing.**

~~Develop and submit a field acceptance test (FAT) plan to the Engineer for review and approval. The test plan must demonstrate all functional requirements specified for the device or system under test. Perform the FAT on the equipment covered in Article 682-1. The Engineer reserves the right to witness all tests.~~ Conduct field acceptance testing in accordance with Section 611.

Perform local field inspection~~operational tests~~ at each local CCTV field sites to verify and confirm the following:

1. Physical construction has been completed as specified in the Plans and all existing and proposed lanes are clearly visible with no line of site obstructions.
2. The quality and tightness of ground and surge protector connections.
3. Proper voltages for all power supplies and related power circuits.
4. All connections, including correct installation of communication and power cables.

~~5. Video signal from the camera is present and of consistent quality at all connection points between the camera, the cabinet, and any video devices therein.~~

~~6. The communication link between the cabinet and the camera is functioning properly by performing PTZ and focus in all directions and executing a minimum of three other unique programming commands.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **684**  
Proposed Specification: **6840104 Network Devices.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from Traffic Engineering and Operations Office to provide guidance on field acceptance testing in accordance to Section 611.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**NETWORK DEVICES**  
**(REV 11-12-20)**

SUBARTICLE 684-1.4 is deleted and the following substituted:

**684-1.4 Field Acceptance Testing:** ~~Develop and submit a field acceptance test (FAT) plan to the Engineer for review and approval. The Engineer reserves the right to witness all FATs.~~ Conduct field acceptance testing in accordance Section 611.

Once the MFES has been installed, conduct local ~~FATs~~ field inspection at the MFES field site according to the approved test plan. Perform the following:

1. Verify that physical construction has been completed as detailed in the Plans.
2. Inspect the quality and tightness of ground and surge protector connections.
3. Verify proper voltages for all power supplies and related power circuits.
4. Connect devices to the power sources.
5. Verify all connections, including correct installation of communication and power cables.
- ~~6. Verify configuration of the MFES Internet Protocol (IP) addresses and subnetwork mask.~~
- ~~7. Verify the network connection to the MFES through ping and SSH sessions from a remote personal computer (PC).~~
- ~~8. Perform testing on multicast routing functionality.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **700**  
Proposed Specification: **7000102 HIGHWAY SIGNING.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dana Knox from the Roadway Traffic Engineering and Operations Office to add language for the in-street R1-6a sign to the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**HIGHWAY SIGNING**  
**(REV ~~11-9~~12-7-20)**

SUBARTICLE 700-1.2.3 is deleted and the following substituted:

**700-1.2.3 Static Sign Assembly Requirements:** ~~All sign panels shall be aluminum unless otherwise shown in the Plans. See 700-7 for In-Street sign requirements.~~ Sheets and plates for sign panels shall meet the requirements of ASTM B209, Aluminum Association Alloy 6061-T6, 5154-H38 or 5052-H38. Sign panels for single column ground mounted signs shall utilize aluminum plate with a minimum thickness of 0.08 inches. All other sign panels shall utilize aluminum plate with a minimum thickness of 0.125 inches. All panels shall have rounded corners. For flip up signs, the continuous hinge shall be stainless steel ANSI grade 316.

SUBARTICLE 700-1.2.4 is deleted and the following substituted:

**700-1.2.4 Retroreflective Sign Sheeting:** Use signs that meet the material and process requirements of Section 994.

Use Type XI sheeting for all regulatory, warning, and overhead signs unless otherwise specified. The R1-1, R1-2, R5-1 and R5-1a signs must use a sheeting system that includes a colorless film overlay.

Type XI sheeting shall also be used for all limited access advance exit and exit guide signs.

Use Type IV fluorescent yellow-green ~~fluorescent~~ sheeting for the following signs:

1. school: S1-1, S3-1, S3-2, S4-5, S4-5a, S5-1 (SCHOOL portion),

2. bicycle: W11-1,

3. pedestrian: R1-6, R1-6a, R1-6b, R1-6c, R1-9, R1-9a, R10-15, W11-2,

4. shared use path (trail): W11-15, W11-15a,

5. supplemental panels used with signs in (1) through (4), above.

Do not mix signs having fluorescent yellow-green sheeting with signs having yellow retroreflective sheeting.

Use Type VI sheeting for Roll-up signs ~~shall meet the requirements of Type VI sheeting.~~

Use Type IV sheeting for all other signs.

Use Type IV or Type XI sheeting for retroreflective strips on signs.

SECTION 700 is expanded by the following new Article.

**700-7 In-Street Signs.**

**700-7.1 Description:** In-Street signs consist of the R1-6a or R1-6c In-Street Pedestrian Crossing Sign assemblies including the sign base.

**700-7.2 Materials:** The sign assembly includes the vertical panel, retroreflective sign sheeting, a rebounding boot support, and a base. The vertical sign panel is bolted to a flexible boot, which is fastened to a plastic, recycled PVC, or rubber base and secured to the pavement surface. The sign assembly shall contain no upright metal parts.

The vertical panel shall yield (bend) fully upon vehicle impact, then return to vertical position plus or minus 10 degrees with no delaminating. -The face of the vertical panel shall resist twisting and remain oriented to the installed direction after vehicle impact. The sign shall not split, crack, break, or separate from base.

**700-7.2.1 Vertical Panel:** Use only UV stabilized, ozone and hydrocarbon resistant outdoor-grade thermoplastic polymer, polycarbonate, recycled PVC, or HDPE materials. UV stabilization testing shall be in accordance with ASTM- (D1435).

Place retroreflective sign sheeting on both sides of the vertical panel.

The surface of the panel shall be smooth and free of defects, suitable for adherence of appropriate retroreflective sheeting.

**700-7.2.2 Sign Sheeting Legend:** The legend of the sign (white) shall be of the same grade of retroreflective sheeting as the body of the sign.

**700-7.2.3 Base:**

**700-7.2.3.1 Sign Base (Fixed):** The base shall be constructed with high-impact materials using ozone and hydrocarbon resistant outdoor-grade thermoplastic polymer, polycarbonate, or HDPE materials meeting the general provisions for all In-Street sign bases.

**700-7.2.3.2 Sign Base (Portable):** Portable base assemblies shall consist of a lightweight plastic, recycled PVC, or rubber material that may be easily moved or relocated by a single person.

**700-7.2.3.3 Color:** Sign bases shall be either black, or the same color as the adjacent pavement marking.

**700-7.2.4 Approved Product List (APL):** Use In-Street Signs listed on the APL.- Manufacturers seeking inclusion on the APL must submit the following in accordance with Sectio 6:

1. Product Photo
2. Product Drawings, which at a minimum includes:
  - a. Model Number
  - b. Allowable sign panel size and substrate
  - c. Dimensions of sign base and mounting heights
3. Installation Instructions
4. Crash Test Reports demonstrating MASH compliance
5. All FHWA Eligibility Letters
6. When requested, submit product sample

**700-7.3 Fabrication of Panel Messages:** Fabricate standard sign panel messages in accordance with the Standard Plans. Sign panels of 8" wide x 28" tall or 12" x 36" are acceptable. See Standard Plans Section 700-102.

**700-7.4 Connection Method:** Install a fixed base connection in accordance with the manufacturer's instructions. Install portable base connections only for temporary applications at school crossings where a crossing guard is present during school arrival and departure times or when children are present.

**700-7.5 Method of Measurement:** Quantities to be paid will be per each assembly.

7000201

All Jobs

700-7.6 Basis of Payment: Price and payment will be full compensation for all work and materials specified in this Section, including connection hardware.

Payment will be made under:

Item No. 700- 15 In-Street Sign, per Assembly



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **700**  
Proposed Specification: **7000419 HIGHWAY SIGNING.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to add new interfaces to connect with electronic sign controllers and update language in the Standard Specification. Please note this proposed change is complemented by the pending proposed change to Section 611.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## HIGHWAY SIGNING (REV 11-12-20)

SUBARTICLE 700-4.19 is deleted and the following substituted:

**700-4.19 Installed Site Tests:** ~~Conduct an approved, stand-alone equipment installation test at the field site. Test all stand-alone (i.e., non-network) functions of the field equipment using equipment installed as detailed in the Plans and as approved by the Engineer.~~

~~Complete approved data forms and turn them over to the Engineer for review and as a basis for rejection or acceptance. Provide a minimum notice of 30 calendar days prior to all tests to permit the Engineer or their representative to observe each test.~~

~~If any unit fails to pass its stand-alone test, correct the unit or substitute another unit in its place, then repeat the test.~~

~~If a unit has been modified as a result of a stand-alone test failure, prepare a report describing the nature of the failure and the corrective action taken and submit it to the Engineer prior to re-testing the unit. If a failure pattern develops, the Engineer may direct that design and construction modifications be made to all units without additional cost to the Department or an extension of the Contract Time.~~ Conduct Intelligent Transportation System Device Installation testing in accordance with Section 611.

SUBARTICLE 700-4.20 is deleted and the following substituted:

**700-4.20 System Testing:** ~~Conduct approved DMS system tests on the field equipment with the master equipment including, at a minimum, all remote control functions. Display the return status codes from the sign controller for a minimum of 72 hours. Complete approved data forms and turn them over to the Engineer for review, and as a basis for rejection or acceptance.~~

~~Demonstrate the sign's ability to display the proper predefined message or remain blank when power is restored following an AC power interruption.~~

~~If the system test fails because of any subsystem component, repair that component or substitute another in its place, then repeat the test. If a component has been modified as a result of a system test failure, prepare a report and submit it to the Engineer prior to retesting.~~ Conduct Intelligent Transportation System Device Installation testing in accordance with Section 611.

SUBARTICLE 700-4.21 is deleted and the following substituted:

**700-4.21 Operational Testing:** ~~After the system testing is successfully completed; conduct one continuous 72-hour, full-operating test prior to conducting the 30-day acceptance test. The Engineer will approve the type of tests to be conducted. Include in the tests all control, monitoring, and communications functions of the field equipment by the master equipment.~~

**Warranty:** Ensure that the DMS system and equipment has a manufacturer's warranty covering defects for a minimum of five years from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608.

SUBARTICLE 700-4.22 is deleted and the following substituted:

~~700-4.22~~ **Acceptance Testing:** Conduct a 30-day acceptance test after the successful completion of the approved 72-hour operational test. During the 30-day test period, limit downtime due to mechanical, electrical, or other malfunctions to a maximum total of five calendar days. If the equipment fails to operate for a total of five or more calendar days, testing will be restarted. The Engineer may select to pause and extend the 30-day test period by the number of days lost by failure and repair time in lieu of restarting the full 30-day test. The Engineer will submit to the Contractor a letter of approval and completion stating the first and last day of the 30-day test period. **Method of Measurement:** For each DMS, the quantity to be paid will be each sign furnished, installed, completed in accordance with the details shown in the Plans, warranted, made fully operational, and tested in accordance with Section 611.

For each DMS Support Structure, the quantity to be paid will be each structure furnished, installed, completed in accordance with the details shown in the Plans; including posts and supports, catwalks, handrails, footings, excavation, site grounding, painting, and incidentals necessary to complete the work.

SUBARTICLE 700-4.23 is deleted and the following substituted:

~~700-4.23~~ **Warranty:** Ensure that the DMS system and equipment has a manufacturer's warranty covering defects for a minimum of five years from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608. **Basis of Payment:** Price and payment will be full compensation for furnishing all materials and completing all work as specified in this Section or as shown in the Plans.

Payment will be made under:

- Item No. 700- 7- Embedded Dynamic Message Sign - each.
- Item No. 700- 8- Front Access Dynamic Message Sign - each.
- Item No. 700- 9- Walk-in Dynamic Message Sign - each.
- Item No. 700- 10- Dynamic Message Sign Support Structure - each.

SUBARTICLE 700-4.24 is deleted.

~~700-4.24~~ **Method of Measurement:** For each DMS, the quantity to be paid will be each sign furnished, installed, complete in accordance with the details shown in the Plans, warranted, made fully operational, and tested in accordance with the specifications in this Section.

~~For each DMS Support Structure, the quantity to be paid will be each structure furnished, installed, complete in accordance with the details shown in the Plans; including posts and supports, catwalks, handrails, footings, excavation, site grounding, painting, and incidentals necessary to complete the work.~~

SUBARTICLE 700-4.25 is deleted.

~~700-4.25 Basis of Payment: Price and payment will be full compensation for furnishing all materials and completing all work as specified in this Section or as shown in the Plans.~~

~~Payment will be made under:~~

~~Item No. 700-7 Embedded Dynamic Message Sign each.~~

~~Item No. 700-8 Front Access Dynamic Message Sign each.~~

~~Item No. 700-9 Walk-in Dynamic Message Sign each.~~

~~Item No. 700-10 Dynamic Message Sign Support Structure each.~~

SUBARTICLE 700-5.2.3.1 is deleted and the following substituted:

**700-5.2.3.1 Communication:** The electronic display controller shall possess a minimum of one serial, Ethernet, USB, or Bluetooth interface with the ability to connect to a laptop computer. The serial data interface shall support multiple data rates from 9,600 bps to 115,200 bps.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 18, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **701**  
Proposed Specification: **7010900 PROFILED THERMOPLASTIC PAVEMENT MARKINGS**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the State Construction Office to update language to plan quantity in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## PROFILED THERMOPLASTIC PAVEMENT MARKINGS (REV 11-3-20)

ARTICLE 701-9 is deleted and the following substituted:

### ~~701-10-9~~ **Submittals**. **Method of Measurement.**

~~701-9.1 Submittal Instructions:~~ Prepare a certification of quantities, using the Department's current approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities.

~~701-9.2 Contractor's Certification of Quantities:~~ Request payment by submitting a certification of quantities no later than Twelve O'clock noon Monday after the estimate cut off date or as directed by the Engineer, based on the amount of work done or completed. Ensure the certification of quantities consists of the following:

~~1. Contract Number, FPID Number, Certification Number, Certification Date and the period that the certification represents.~~

~~2. The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown shown on the certification of items of payment.~~

**701-9.1 Profiled Thermoplastic Markings:** ~~The quantities of 6 inch solid and 10'-30' skip lines to be paid will be the plan quantity length, authorized and acceptably applied, under this Section will be paid as follows:~~

~~1. The length, in gross miles, subject to 9-1.3.2. The gross mile measurement will be taken as the distance from the beginning of the profiled thermoplastic line to the end of the profiled thermoplastic line and will include the unmarked gaps for skip lines. The gross mile will not include designated unmarked lengths at intersections, turn lanes, etc., of 6 inch solid and 10'-30' skip lines.~~

**701-9.2 Removal of Existing Thermoplastic Markings:** ~~The quantity to be paid for removal of existing thermoplastic pavement markings will be 2. The area, in square feet, for removal of existing thermoplastic pavement markings acceptably removed. Payment for removal of thermoplastic pavement markings will only be made for locations where the existing pavement surface is to remain.-~~

~~The gross mile measurement will be taken as the distance from the beginning of the profiled thermoplastic line to the end of the profiled thermoplastic line and will include the unmarked gaps for skip lines. The gross mile will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.~~

ARTICLE 701-10 is deleted and the following substituted:

### ~~701-11-10~~ **Method of Measurement**. **Basis of Payment.**

~~The quantities, authorized and acceptably applied, under this Section will be paid as follows:~~

~~1. The length, in gross miles, of 6 inch solid and 10'-30' skip lines.~~

~~2. The area, in square feet, for removal of existing thermoplastic pavement markings acceptably removed. Payment for removal of thermoplastic pavement markings will only be made for locations where the existing pavement surface is to remain.~~

~~The gross mile measurement will be taken as the distance from the beginning of the profiled thermoplastic line to the end of the profiled thermoplastic line and will include the unmarked gaps for skip lines. The gross mile will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.~~

Price and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

Item No. 701	Profiled Thermoplastic Pavement Markings.
	Solid - per gross mile
	Skip - per gross mile
	Remove - per square foot

ARTICLE 701-11 is deleted.

#### **~~701-11 Basis of Payment.~~**

~~Price and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.~~

~~Payment will be made under:~~

<del>Item No. 701</del>	<del>Profiled Thermoplastic Pavement Markings.</del>
<del>_____</del>	<del>Solid - per gross mile</del>
<del>_____</del>	<del>Skip - per gross mile</del>
<del>_____</del>	<del>Remove - per square foot</del>



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **704**  
Proposed Specification: **7040000 TUBULAR MARKERS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Gevin McDaniel from the Roadway Design Office to use the same product as the Managed Laned Markers for permanent channelizing devices on Arterials and Collectors. The colors for these Tubular Markers will be the same as the lane line that they supplement (white or yellow) per the MUTCD requirements. This language will be added as a new Section to the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**TUBULAR MARKERS**

(REV ~~9-28~~12-14-20)

The following new Section is added after Section 701.

**SECTION 704**  
**TUBULAR MARKERS**

**704-1 Description.**

Furnish and install tubular markers at the locations called for in the Standard Plans or in the Plans.

**704-2 Materials.**

Meet the following requirements:

Durable Tubular Markers.....Section 991

Standard Tubular Markers .....Section 991

**704-2.1 Product Acceptance on the Project:** Use tubular markers listed on the Department's Approved Product List (APL).

**704-3 Installation Requirements.**

Install tubular markers in accordance with the manufacturer's installation instructions posted on the APL. Use the same color as the pavement marking being emphasized.

**704-4 Method of Measurement.**

The quantity to be paid will be the plan quantity of the number of tubular markers furnished, installed, and accepted.

**704-5 Basis of Payment.**

Prices and payments will be full compensation for work specified in this Section, including the cost of labor, materials, and incidental items required to complete the work.

Payment will be made under:

Item No. 704 - 1      Tubular Marker - each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **706**  
Proposed Specification: **7060200 RAISED PAVEMENT MARKERS AND  
BITUMINOUS ADHESIVE.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

This change was proposed by Melissa Hollis from the State Estimates Office to separate RPMs from 710-90 Final Surface measurement in the Standard Specification. Please note there are two other proposed revisions associated to this revision, 1020200, and 7100200.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**RAISED PAVEMENT MARKERS AND BITUMINOUS ADHESIVE**  
**(REV ~~10-130-201~~)**

ARTICLE 706-2 is deleted and the following replaced:

**706-2 Materials.**

Use only Class B markers, except as follows: ~~unless otherwise shown in the Plans.~~

For center line rumble strip installations where RPMs are in conflict with the grinding, install Class D RPMs with the first application of standard paint. Remove Class D RPMs prior to grinding, then install Class B RPMs in an unground area after grinding.

Install Class F RPMs only when shown in the plans.

Meet the requirements of Section 970.

**706-2.1 Product Acceptance on the Project:** Use only RPMs and bituminous adhesive that are listed on the Department's Approved Product List (APL). For Class F RPMs, provide a warranty assigned to the Department in accordance with Section 970.

ARTICLE 706-4 is deleted and the following replaced:

**706-4 Application.**

Install RPMs in accordance with the Plans and Standard Plans, Indexes 706-001 and 711-003, prior to opening the road to traffic.

Apply RPMs to the bonding surface using bituminous or epoxy adhesives in accordance with the manufacturer's instructions.

For Class F RPMs, installation may include the removal of roadway surface material to recess a portion of the RPM housing.

Prior to application of adhesive, clean the portion of the bonding surface of any material which would adversely affect the adhesive.

Apply the adhesive to the bonding surface (not the RPM) so that 100% of the bonding area of the RPM will be covered, in accordance with adhesive manufacturer's recommendations. Apply sufficient adhesive to ensure that when the marker is pressed downward into the adhesive, adhesive will be forced out around the entire perimeter of the RPM.

Immediately remove excess adhesive from the bonding surface and exposed surfaces of the RPMs. Soft rags moistened with mineral spirits meeting Federal Specifications TT-T-291 or kerosene may be used to remove adhesive from exposed faces of the RPMs. Do not use any other solvent. If any adhesive, pavement marking materials or other foreign matter adheres to the traffic face of the RPM, replace the RPM at no cost to the Department.

Restore any areas impacted by the installation of Class F RPMs to original condition.

Ensure that all final RPMs are in place prior to opening the road to traffic.

If more than 2% of the RPMs fail in adhesion or alignment within the first 45 days under traffic, replace all failed RPMs at no expense to the Department. If more than 5% of the RPMs fail in adhesion and or alignment during the initial 45 day period, the Engineer will extend the replacement period an additional 45 days from the date that all replacement RPMs have been installed. If, at the end of the additional 45 day period, more than 2% of all RPMs (initial installation and 45 day replacements combined) fail in adhesion or alignment, replace all failed RPMs at no expense to the Department.

ARTICLE 706-6 is deleted and the following substituted:

**706-6 Method of Measurement.**

The ~~quantities to be paid for will be the number~~ quantity of RPMs to be paid for under this Section will be the Plan Quantity per each, furnished and installed, completed and accepted.

ARTICLE 706-7 is deleted and the following substituted

**706-7 Basis of Payment.**

~~706-7.1 Class B RPMs: Price and payment for Class B RPMs will not be measured or paid for separately when the item for painted pavement markings (Final Surface) is included in the proposal. Price and payment for all work and materials in this Section will be made in accordance with 710-11.2.~~

~~For projects without Final Surface Pavement Markings, p~~Price and payment for Class B RPMs will be full compensation for all work and materials in this Section.

706-7.2 Class D RPMs: Payment will be made in accordance with Section 102.

~~706-7.23~~ **Class F RPMs:** Price and payment for Class F RPMs will be full compensation for all work and materials in this Section.

~~706-7.34~~ **Payment Items:** Payment will be made under:

Item No. 706- 1- Raised Pavement Marker - per each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 21, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **709**  
Proposed Specification: **7090900 TWO REACTIVE COMPONENTS PAVEMENT MARKINGS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the State Construction Office to update language to plan quantity in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## TWO REACTIVE COMPONENTS PAVEMENT MARKINGS (REV 11-3-20)

ARTICLE 709-9 is deleted and the following substituted:

### ~~709-10 9~~ **Submittals**. **Method of Measurement.**

~~709 9.1 Submittal Instructions:~~ Prepare a certification of quantities, using the Department's current approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities.

~~709 9.2 Contractor's Certification of Quantities:~~ Request payment by submitting a certification of quantities no later than Twelve O clock noon Monday after the estimate cut off date or as directed by the Engineer, based on the amount of work done or completed. Ensure the certification of quantities consists of the following:

~~1. Contract Number, FPID Number, Certification Number, Certification Date and the period that the certification represents.~~

~~2. The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown provided on the certification of items of payment.~~

**709-9.1 Two Reactive Components Markings:** ~~The quantities~~ quantity of solid, 10'-30' skip, and 3'-9' dotted, 6'-10' dotted, 2'-2' dotted, and 2'-4' dotted lines to be paid will be the plan quantity length, in gross miles, subject to 9-1.3.2, ~~authorized and acceptably applied, under this Section will be paid as follows:~~

~~The gross mile measurement will be taken as the distance from the beginning of the two reactive component line to the end of the two reactive component line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.~~ 1. The length, in gross miles, of solid, 10'-30' skip, and 3'-9' dotted, 6'-10' dotted, 2'-2' dotted, and 2'-4' dotted lines.

**701-9.2 Removal of Existing Thermoplastic Markings:** ~~The quantity to be paid for removal of existing thermoplastic pavement markings will be~~ 2. ~~The~~ the area, in square feet, for removal of existing markings acceptably removed. ~~Payment for removal of thermoplastic pavement markings will only be made for locations where the existing pavement surface is to remain.~~ ~~Payment for removal of conflicting markings will be in accordance with 102-5.8.~~ Payment for removal of non-conflicting markings will be paid separately.

ARTICLE 709-10 is deleted and the following substituted:

### ~~709-10~~ **Method of Measurement**. **Basis of Payment.**

~~The quantities, authorized and acceptably applied, under this Section will be paid as follows:~~

~~1. The length, in gross miles, of solid, 10'-30' skip, and 3'-9' dotted, 6'-10' dotted, 2'-2' dotted, and 2'-4' dotted lines.~~

~~2. The area, in square feet, for removal of existing markings acceptably removed. Payment for removal of conflicting markings will be in accordance with 102-5.8. Payment for removal of non-conflicting markings will be paid separately.~~

~~The gross mile measurement will be taken as the distance from the beginning of the two reactive component line to the end of the two reactive component line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.~~

Price and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

Item No. 709	Two Reactive Components
	Solid - per gross mile.
	Skip - per gross mile.
	Remove - per square foot.

ARTICLE 709-11 is deleted.

#### ~~709-11 Basis of Payment.~~

~~Price and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.~~

~~Payment will be made under:~~

<del>Item No. 709</del>	<del>Two Reactive Components</del>
<del>_____</del>	<del>Solid - per gross mile.</del>
<del>_____</del>	<del>Skip - per gross mile.</del>
<del>_____</del>	<del>Remove - per square foot.</del>



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 22, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **710**  
Proposed Specification: **7100200 PAINTED PAVEMENT MARKINGS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the State Estimates Office to separate RPMs from 710-90 Final Surface measurement in the Standard Specification. The change also affects Sections 102 and 706, addressed in separate memos.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PAINTED PAVEMENT MARKINGS**  
**(REV 9-28-20)**

ARTICLE 710-2 is deleted and the following substituted:

**710-2 Materials.**

Use only materials listed on the Department's Approved Product List (APL) meeting the following requirements:

<del>Materials for Raised Pavement Markers (RPMs) and Bituminous Adhesive</del> .....	<del>Section 970</del>
Standard Paint .....	971-1 and 971-3
Durable Paint .....	971-1 and 971-4
Glass Spheres .....	971-1 and 971-2

The Engineer will take random samples of all material in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

SUBARTICLE 710-4.1.1 is deleted and the following substituted:

**710-4.1.1 Painted Pavement Markings (Final Surface):** On concrete surfaces or newly constructed asphalt, the painted pavement markings (final surface) will include one application of standard paint ~~and one application of Class B RPMs~~ applied to the final surface.

For center line and edge line rumble strip installations where the pavement marking is placed within the grinding, apply a second application of standard paint within 24 hours of each day's grinding operation.

~~For center line rumble strip installations where RPMs are in conflict with the grinding, install Class D RPMs with the first application of standard paint. Remove Class D RPMs prior to grinding, then install Class B RPMs in an unground area after grinding.~~

Do not apply final surface paint for bicycle arrows or bicycle messages, 24 inch longitudinal bars in special emphasis crosswalks, or route shields where preformed thermoplastic will be applied.

~~Install all RPMs in accordance with Standard Plans, Indexes 706-001 and 711-003, prior to opening the road to traffic.~~

~~Temporary RPMs must meet the requirements of Section 102.~~

~~Permanent RPMs must meet the requirements of Section 706.~~

SUBARTICLE 710-11.2 is deleted and the following substituted:

**710-11.2 Painted Pavement Markings (Final Surface):** Price and payment for painted pavement markings (final surface) will be full compensation for all applications of painted pavement markings, ~~and all applications and removal of RPMs~~ in accordance with 710-4.1.1 and 710-9.1.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 5, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **711**  
Proposed Specification: **7110900 THERMOPLASTIC PAVEMENT MARKINGS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the State Construction Office to update language to plan quantity in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## THERMOPLASTIC PAVEMENT MARKINGS

(REV ~~11-43-210~~)

ARTICLE 711-9 is deleted and the following

### ~~711-10-9 Submittals.~~ **Method of Measurement.**

~~711-9.1 Submittal Instructions: Prepare a certification of quantities, using the Department's current approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities.~~

**Thermoplastic Pavement Markings:** ~~The plan quantity,~~ The certified quantities authorized and acceptably applied and subject to 9-1.3.2, under this Section will be paid as follows:

1. The length, in gross miles, of solid, 10'-30' skip, 3'-9' dotted, 6'-10' dotted, 2'-2' dotted, and 2'-4' dotted lines.
2. The length, in linear feet, of transverse lines, diagonal lines, chevrons, ~~and~~ parking spaces, special emphasis crosswalk markings, and railroad dynamic envelope markings.
3. The number of pavement messages, symbols, and arrows. Each arrow is paid as a complete marking, regardless of the number of "points" or directions.

The gross mile measurement will be taken as the distance from the beginning of the thermoplastic line to the end of the thermoplastic line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc.

~~711-9.2 Contractor's Certification of Quantities:~~ **Removal of Existing Thermoplastic Markings:** ~~For all items except railroad dynamic envelope, request payment by submitting a certification of quantities no later than Twelve O'clock noon Monday after the estimate cut-off date or as directed by the Engineer, based on the amount of work done or completed. Ensure the certification of quantities consists of the following:~~

- ~~1. Contract Number, FPID Number, Certification Number, Certification Date and the period that the certification represents.~~
- ~~2. The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown provided on the certification of items of payment. The quantity for removal of existing thermoplastic pavement markings to be paid will be the area, in square feet, acceptably removed. Payment for removal of thermoplastic pavement markings will only be made for locations where the existing pavement surface is to remain.~~

ARTICLE 711-10 is deleted and the following substituted:

### ~~711-10 Method of Measurement.~~ **Basis of Payment.**

~~711-10.1 Certified Quantities: The certified quantities, authorized and acceptably applied, under this Section will be paid as follows:~~

- ~~1. The length, in gross miles, of solid, 10'-30' skip, 3'-9' dotted, 6'-10' dotted, 2'-2' dotted, and 2'-4' dotted lines.~~
- ~~2. The length, in linear feet, of transverse lines, diagonal lines, chevrons, and parking spaces.~~

~~\_\_\_\_\_ 3. The number of pavement messages, symbols, and arrows. Each arrow is paid as a complete marking, regardless of the number of "points" or directions.~~

~~\_\_\_\_\_ 4. The area, in square feet, for removal of existing thermoplastic pavement markings acceptably removed. Payment for removal of thermoplastic pavement markings will only be made for locations where the existing pavement surface is to remain.~~

~~\_\_\_\_\_ The gross mile measurement will be taken as the distance from the beginning of the thermoplastic line to the end of the thermoplastic line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.~~

~~\_\_\_\_\_ **711-10.2 Plan Quantities:** The plan quantity length, in linear feet of railroad dynamic envelope markings.~~

Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

Item No. 711	Thermoplastic Pavement Markings
	Solid - per gross mile.
	Solid - per linear foot.
	Skip - per gross mile.
	Dotted - per gross mile.
	Message or Symbol - each.
	Arrows - each.
	Yield Line - per linear foot.
	Railroad Dynamic Envelope - per linear foot.
	Remove - per square foot.

ARTICLE 711-11 is deleted.

### **711-11 Basis of Payment.**

~~\_\_\_\_\_ Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.~~

~~\_\_\_\_\_ Payment will be made under:~~

<del>_____</del> Item No. 711	<del>_____</del> Thermoplastic Pavement Markings
<del>_____</del>	<del>_____</del> Solid - per gross mile.
<del>_____</del>	<del>_____</del> Solid - per linear foot.
<del>_____</del>	<del>_____</del> Skip - per gross mile.
<del>_____</del>	<del>_____</del> Dotted - per gross mile.
<del>_____</del>	<del>_____</del> Message or Symbol - each.
<del>_____</del>	<del>_____</del> Arrows - each.
<del>_____</del>	<del>_____</del> Yield Line - per linear foot.

7110900D01

All Jobs

~~Railroad Dynamic Envelope — per linear foot.~~

~~Remove — per square foot.~~





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 4, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **713**  
Proposed Specification: **7130900 PERMANENT TAPE PAVEMENT MARKINGS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the State Construction Office to update language to plan quantity in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PERMANENT TAPE PAVEMENT MARKINGS**  
**(REV 11-43-210)**

ARTICLE 713-9 is deleted and the following substituted:

**713-9 Submittals.Method of Measurement.**

**713-9.1 Submittal Instructions Permanent Tape Markings:** Prepare a certification of quantities, using the Department's current approved form, for each project in the Contract. Submit the certification of quantities and daily worksheets to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities. The quantities of 6 inch solid, 10'-30' skip, and 3'-9' dotted lines to be paid will be the plan quantity length, in gross miles, subject to 9-1.3.2.

The gross mile measurement will be taken as the distance from the beginning of the permanent tape line to the end of the permanent tape line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc.

**713-9.2 Contractor's Certification of Quantities Removal of Existing Markings:** Request payment by submitting a certification of quantities no later than Twelve O'clock noon Monday after the estimate cut-off date or as directed by the Engineer, based on the amount of work done or completed. Ensure the certification of quantities consists of the following:

1. Contract Number, FPID Number, Certification Number, Certification Date and the period that the certification represents.
2. The basis for arriving at the amount of the progress certification, less payments previously made and less any amount previously retained or withheld. The basis will include a detailed breakdown provided on the certification of items of payment. The quantity to paid for removal of existing permanent tape pavement markings will be the area, in square feet, for removal of existing markings acceptably removed. Payment for removal of existing permanent tape pavement markings will only be made for locations where the existing pavement surface is to remain.

ARTICLE 713-10 is deleted and the following substituted:

**713-10 Method of Measurement Basis of Payment.**

~~The quantities, authorized and acceptably applied, under this Section will be paid as follows:~~

- ~~1. The length, in gross miles, of 6 inch solid, 10' 30' skip, and 3' 9' dotted lines.~~
- ~~2. The area, in square feet, for removal of existing markings acceptably removed.~~

~~Payment for removal of conflicting markings will be in accordance with 102-5.8. Payment for removal of non-conflicting markings will be paid separately.~~

~~The gross mile measurement will be taken as the distance from the beginning of the permanent tape line to the end of the permanent tape line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.~~ Price and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials,

application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

- Item No. 713- 1- Permanent Tape.
- Solid – per gross mile.
  - Skip – per gross mile.
  - Dotted – per gross mile.
  - Remove – per square foot.

ARTICLE 713-11 is deleted.

**~~713-11 Basis of Payment.~~**

~~Price and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.~~

~~Payment will be made under:~~

- ~~Item No. 713- 1- Permanent Tape.~~
- ~~\_\_\_\_\_ Solid – per gross mile.~~
  - ~~\_\_\_\_\_ Skip – per gross mile.~~
  - ~~\_\_\_\_\_ Dotted – per gross mile.~~
  - ~~\_\_\_\_\_ Remove – per square foot.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **715**  
Proposed Specification: **7150000 Highway Lighting System.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the State Construction Office to include paint requirements for conventional light pole assemblies to Section 715. Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## HIGHWAY LIGHTING SYSTEM (REV 12-10-20)

SECTION 715 is deleted and the following substituted:

### **715-1 Description.**

Install a highway lighting system in accordance with the details shown in the Plans. Use pole assemblies as shown in the Standard Plans when standard aluminum pole assemblies or standard high mast light assemblies are required by the Contract Documents. Include in the system the light poles, bases, luminaires, ballasts, cable, conduit, protective devices, and control devices; all as specified or required for the complete facility.

Obtain conventional light pole and high mast light pole assemblies from a fabrication facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105.

Provide metal lighting poles, excluding high mast lighting, with internal vibration damping devices in accordance with Standard Plans, Index 715-002 in all installations on bridges, walls and median concrete barriers.

### **715-2 Painting:**

**715-2.1 General:** When required by the Contract Documents, provide painted conventional light pole assemblies. Provide products that will meet specification requirements throughout the warranty period. Meet the color requirement as specified in the Contract Documents. Provide the Engineer with two metal sample coupons, a minimum of 2 inches by 4 inches, painted concurrently and with the same paint as was used on the first lot of any conventional aluminum light poles assemblies delivered to the jobsite. Submit sample coupons and manufacturer product data sheets to the Engineer along with the delivery of the first shipment of any painted conventional aluminum light pole assemblies delivered to the jobsite. At the time of their delivery, the sample coupons described in this paragraph must match the color of the conventional light pole assemblies to within 1ΔE measured as specified in 975-4. If the delivered sample coupons exhibit a difference in color from the conventional light pole assemblies greater than 1ΔE then the sample coupons will be considered unacceptable and no payment shall be made for the materials which the sample coupons represent. Those materials shall not be accepted by the Department until acceptable representative sample coupons in accordance with the requirements of this Section have been submitted to the Engineer.

**715-2.2 Responsible Party Warranty:** When the Contract Documents call for painted conventional light pole assemblies the Contractor shall designate a responsible party to accept responsibility. The responsible party designated by the Contractor must execute and submit to the Department a form, provided by the Department, prior to the first delivery to the jobsite of any painted conventional light pole assemblies stipulating that the responsible party accepts responsibility for ensuring the coating system adhesion and color retention requirements as specified in 975-4 are met for a period of five years after final acceptance in accordance with 5-11. The responsible party shall also bear the continued responsibility for performing all remedial work associated with repairs of any adhesion or color retention failure as defined in Section 975, as to which notice was provided to the responsible party within the five year warranty period. Failure to timely designate the responsible party will result in the Contractor being the responsible party unless otherwise agreed to in writing by the Department. The responsible party

shall be either the Contractor or the supplier of the painted conventional light pole assemblies. When the responsible party is the fabricator, the responsible party shall be one of the fabricators listed on the Prequalified Painted Galvanized Steel and Aluminum Products Fabricators List. This list may be viewed on the Department's website at the following URL: <https://www.fdot.gov/construction/Engineers/PaintedPoleSuppliers.shtm>

Upon final acceptance of the Contract in accordance with 5-11, the Contractor's responsibility to ensure that the coating system adhesion and color retention requirements specified in 975-4 will terminate. The obligations of the responsible party set forth in this Section shall start at final acceptance of the Contract in accordance with 5-11 and continue thereafter until expiration of the five-year warranty period.

### **715-2-3 Shop Drawings and Working Drawings.**

Submit shop drawings and working drawings with descriptive specifications and engineering data for the service main, control panel enclosure, control panel main disconnect, lighting contactor, electrical panel, transformer, in-line fuse holders, surge protective devices, non-standard light poles (including brackets), luminaires, ballast, photo-electric cell, conduit and cable or any other item requested by the Engineer as specified in Section 5.

### **715-3-4 Materials and Equipment to be Installed.**

**715-34.1 General:** Meet the materials and equipment requirements of Section 992.

**715-34.2 Luminaires:** Use only luminaries listed on the Department's Approved Product List (APL).

**715-34.3 Criterion Designation of Materials and Equipment:** Where a criterion specification is designated for any material or equipment to be installed, by the name or catalog number of a specific manufacturer, understand that such designation is intended only for the purpose of establishing the style, quality, performance characteristics, etc., and is not intended to limit the acceptability of competitive products. The Engineer will consider products of other manufacturers which are approved as similar and equal as equally acceptable.

### **715-4-5 Furnishing of Electrical Service.**

Provide service point in accordance with Section 639

### **715-5-6 Excavation and Backfilling.**

**715-56.1 General:** For excavation and backfilling, meet the requirements of Section 125, except that when rock is encountered, carry the excavation 3 inches below the required level and refill with sand or with selected earth material, 100% of which passes the 1 inch sieve.

**715-56.2 Trenches for Cable:** Construct trenches for cable or conduit no less than 6 inches in width and deep enough to provide a minimum cover in accordance with the Standard Plans.

**715-56.3 Placing Backfill for Cable:** For installation of the cable, place an initial layer of 6 inches thick, loose measurement, sand or selected earth material, 100% of which passes a 1 inch sieve. Place and compact the remaining material in accordance with 125-8.

### **715-6-7 Foundations for Light Poles.**

**715-67.1 Concrete Foundations:** Provide foundations for light poles of the sizes and shapes shown in the Plans. Construct precast or cast-in-place concrete foundations in accordance with the Standard Plans. Obtain precast foundations from a plant that is currently on the

Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105.

**715-67.2 Setting Anchor Bolts:** Set anchor bolts according to manufacturer's templates and adjust to a plumb line, check for elevation and location, and hold rigidly in position to prevent displacement while pouring concrete.

**715-67.3 Installation:** Do not erect roadway light poles or high mast light poles until the concrete strength in the cast-in-place foundation is at least 2,500 psi. Determine concrete strength from tests on a minimum of two test cylinders sampled and tested in accordance with ASTM C31 and ASTM C39 and verifying test results have been submitted to the Engineer.

Fill the voids around precast concrete foundations under roadway light poles with flowable fill meeting the requirements of Section 121 or clean sands placed using hydraulic methods to a level 6 inches below grade.

### **715-78 Pulling Conductors.**

Leave at least 3 feet of conductor where the cable enters and leaves conduit. Protect conductors pulled into conduit or ducts against abrasion, kinking, and twisting. Locate pull boxes so that the conductors are not subjected to excessive pulling stresses.

### **715-89 Splicing.**

Make all conductor splices in the bases of the light poles, or in pull boxes designed for the purpose. Do not make underground splices unless specifically authorized by the Engineer, and then only as directed by him.

Unless otherwise shown in the Standard Plans or authorized by the Engineer, splices shall be made with split bolt connectors. The connector shall be sealed in silicone gel that easily peels away leaving a clean connection. The gel will be contained in a closure that when snapped around the split bolt will provide a waterproof connection without the use of tools or taping. This closure will be UV resistant, impact resistant and abrasion resistant.

### **715-910 Conduit.**

Install conduit at the locations shown in the Plans and in accordance with Section 630.

### **715-1011 Erecting Light Poles.**

**715-1011.1 General:** Install the light poles at the locations and in accordance with the details shown in the Plans. Unless otherwise specifically approved by the Engineer, fasten bracket (truss) arms to the pole prior to erection. Erect light poles with the orientation of the access door on the opposite side of approaching traffic. Do not field weld on any part of the pole assembly. Plumb the poles after erection and use metal shims or leveling nuts if necessary to obtain precise alignment. Use a thin cement grout where necessary to eliminate unevenness or irregularities in the top of the base.

**715-1011.2 Adjusting Anchor Bolts and Installing Nuts on Anchor Bolts:** Where poles are to be placed on existing foundations or bases with anchor bolts in place, furnish poles with a base which fits the anchor bolt spacing. Include the cost of any necessary extension of existing anchor bolts in the price bid for the lighting system. For high mast light pole bases, install nuts on anchor bolts in accordance with 649-5.

**715-1011.3 Installation of Luminaire:** Install the luminaire on the truss arm in accordance with the manufacturer's instructions, and place it so that the light pattern is evenly distributed along the roadway.

**715-~~10~~11.4 Electrical Connections:** Make primary ballast connections in accordance with manufacturer's instructions. Install sufficient cable to allow all connections to be made outside the light pole base. Connect the ground conductor to the ground stud provided.

**715-~~10~~11.5 Pole Identification Plates:** Furnish and install a 2 inch by 8 inch aluminum identification plate on each light pole. Attach plates to the pole as approved by the Engineer. Attachment methods requiring screws, bolts, or rivets must be approved by the pole manufacturer. Install plates five feet above grade on the exterior traffic lane side of the pole. Use 3/4 inch black text on white or yellow background. Orient the text vertically on the plate with the following information: load center designation, circuit number, and the pole number. Number the poles as shown in the Plans.

**715-~~10~~11.6 Screen Installation for High Mast Light Pole Bases:** Install a screen in accordance with 649-6.

### **715-~~11~~12 Grounding.**

Ground in accordance with the NEC, and local codes which exceed these Specifications.

Ground each metal light pole, not on a bridge structure, with an approved rod, 20 feet in length and at least 5/8 inch in diameter.

For poles on bridge structures, bring the grounding conductors out to a pull box at each end of the structure and connect them to driven ground rods, 20 feet in length and at least 5/8 inch in diameter.

The 20 feet length of rod may be either two rods 10 feet in length connected by a threaded coupling and driven as a single rod or two rods 10 feet in length separated by at least 6 feet.

Make all bonds between ground wires and grounding electrode assemblies or arrays with an exothermic bond with the following exception: do not exothermically bond grounding electrode to grounding electrode connections.

The work specified in this Section will not be paid for directly, but will be considered as incidental work.

Ground all high mast poles in accordance with the details for grounding in the Standard Plans, Index 715-010.

### **715-~~12~~13 Labeling.**

Stencil labels on the cases of transformer and panel board with white oil paint, as designated by the Engineer. Also, mark the correct circuit designations in accordance with the wiring diagram on the terminal marking strips of each terminal block and on the card holder in the panel board.

### **715-~~13~~14 Tests of Installation.**

Upon completion of the work, test the installation to ensure that the installation is entirely free of ground faults, short circuits, and open circuits and that it is in satisfactory working condition. Furnish all labor, materials, and apparatus necessary for making the required tests. Remove and replace any defective material or workmanship discovered as a result of these tests at no expense to the Department, and make subsequent re-tests to the satisfaction of the Engineer.

Make all arrangements with the power supplier for power. Pay all costs, excluding energy charges, required for the test period.



Not less than 48 hours prior to the beginning of the test period, give the power supplier the schedule for such test.

Test the installation under normal operating conditions during the seven day test period specified in 715-14, rather than as a continuous burn test period.

If the work is not open to traffic at the end of the seven day test period, de-energize the lighting system until the work is opened.

### **715-~~14~~15 Acceptance of Highway Lighting.**

**715-~~14~~15.1 Partial Acceptance:** The Engineer may make partial acceptance of the highway lighting based on satisfactory performance of all highway lighting for seven consecutive days. The seven day evaluation period may commence upon written authorization by the Engineer that highway lighting is considered ready for acceptance evaluation. Contract Time will be charged during the entire highway lighting evaluation period. Correct any defects in materials or workmanship which might appear during the evaluation period at no expense to the Department.

**715-~~14~~15.2 Final Acceptance:** Upon acceptance of as-built drawings, transfer manufacturers' warranties to the Department upon final acceptance in accordance with 5-11. Submit all warranties and warranty transfers to the Engineer.

### **715-~~15~~16 Method of Measurement.**

The quantities to be paid for will be as follows, completed and accepted:

1. Conduit: Payment will be made in accordance with Section 630.
2. Luminaire and Truss Arm: The Contract unit price will include the truss arm, luminaire with lamp, and all necessary mounting hardware as indicated in the Plans and Standard Plans.
3. Service Point: Payment will be made in accordance with Section 639.
4. Load Center: The Contract unit price will include the enclosure, panel boards, breakers, lightning arrestor, contactors, photo electric switch, grounding, and the concrete pad as shown in the Plans and Standard Plans.
5. Luminaire: The Contract unit price will include the luminaire with lamp and necessary mounting hardware as indicated in the Plans and Standard Plans.
6. Pull Box: Payment will be made in accordance with Section 635.
7. High Mast Lighting Pole Complete: The Contract unit price will include the pole, luminaires with lamps, lowering system, breakers and anchor bolts with lock nuts and washers, and foundation as indicated in the Plans and Standard Plans.
8. Conductor: The quantity to be paid for will be the plan quantity, in feet, completed and accepted. Measurement will be based on the horizontal distance between pull boxes, or between pull boxes and luminaire poles, plus 8 feet for each conductor entering and 8 feet for each conductor leaving the pull box and 8 feet for each conductor entering the luminaire pole.
9. Lighting Pole Complete: The Contract unit price will include the pole, internal vibration damping device, truss arm, luminaire with lamp, anchor bolts with lock nuts and washers, frangible base and foundation.
10. Pole Cable Distribution System: The Contract unit price will include the surge protector, fuse holders with fuses, waterproof connectors and the waterproof wiring connection to the luminaires.

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| **715-~~16~~-17 Basis of Payment.**

Prices and payments will be full compensation for all work specified in this Section, including all materials, equipment and tests.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **902**  
Proposed Specification: **9020700 FINE AGGREGATE.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Harvey (Dale) DeFord from the State Materials Office to add lightweight fine aggregate for internal curing to the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**FINE AGGREGATE**  
**(REV 11-5-20)**

ARTICLE 902-7 is deleted and the following substituted:

**902-7 ~~Exceptions, Additions and Restrictions.~~ Lightweight Fine Aggregate for Internal Curing.**

~~Other specification modifications, based on material usage may be found in the appropriate sections of the Specifications.~~ Fine lightweight aggregate suitable for internal curing shall meet the requirements of ASTM C1761.

SECTION 902 is expanded by the following:

**902-78 ~~Exceptions, Additions and Restrictions.~~**

Other specification modifications, based on material usage may be found in the appropriate sections of the Specifications.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **916**  
Proposed Specification: **9160203 BITUMINOUS MATERIALS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko from the State Materials Office to clarify Table 916-1 in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**BITUMINOUS MATERIALS**  
**(REV 10-28-20)**

SUBARTICLE 916-2.3 is deleted and the following substituted:

**916-2.3 Reporting:** Specification compliance testing results shall be reported for the tests in Table 916-1 below, unless noted otherwise. Quality control (QC) testing results shall be reported for original binder DSR ( $G/\sin \delta$  and phase angle, as applicable).

Table 916-1		
SUPERPAVE PG ASPHALT BINDER		
Test and Method	Conditions	Specification Minimum/Maximum Value
Superpave PG Asphalt Binder Grade		Report
APL Number		Report
Modifier (name and type)	Polymer, Ground Tire Rubber with Approved Product List (APL) number, Sulfur, PPA, REOB, and any Rejuvenating Agents	Report
Original Binder		
Solubility, AASHTO T44-14 (2018)	in Trichloroethylene	Minimum 99.0% (Not applicable for PG 76-22 (ARB))
Flash Point, AASHTO T 48-18	Cleveland Open Cup	Minimum 450°F
Rotational Viscosity, AASHTO T 316-19	275°F	Maximum 3 Pa·s <sup>(a)</sup>
Dynamic Shear Rheometer <sup>(b)</sup> , AASHTO T 315-19	$G^*/\sin \delta$	Minimum 1.00 kPa
	Phase Angle, $\delta$ <sup>(c)</sup> PG 76-22 (PMA) and PG 76-22 (ARB) <sup>(d)</sup>	Maximum 75 degrees
Separation Test, ASTM D7173-20 and Softening Point, AASHTO T 53-09 (2018)	163±5°C	Maximum 15°F (PG 76-22 (ARB) only)
	48 hours	
Rolling Thin Film Oven Test Residue (AASHTO T240-13 (2017))		
Rolling Thin Film Oven, AASHTO T240-13 (2017)	Mass Change %	Maximum 1.00
Multiple Stress Creep Recovery, $J_{nr, 3.2}$ AASHTO T 350-19	Grade Temperature (Unmodified binders only)	“S” = 4.50 kPa <sup>-1</sup> max

Multiple Stress Creep Recovery, $J_{nr, 3.2}^{(d, e, f)}$ AASHTO T 350-19	67°C (Modified binders only) 76°C (High Polymer binder only)	“V” = 1.00 kPa <sup>-1</sup> max Maximum $J_{nr, diff} = 75\%$  0.10 kPa <sup>-1</sup> max
Multiple Stress Creep Recovery, %Recovery <sup>(d, e)</sup> AASHTO T 350-19	67°C (Modified binders only) 76°C (High Polymer binder only)	$\%R_{3.2} \geq 29.371 (J_{nr, 3.2})^{-0.2633}$  $\%R_{3.2} \geq 90.0$
Pressure Aging Vessel Residue (AASHTO R 28-12 (2016))		
Dynamic Shear Rheometer, AASHTO T 315-19	$G^* \sin \delta$ , 10 rad/sec.	Maximum 5,000 kPa <sup>(f, g)</sup> <u>Maximum 6,000 kPa<sup>(h)</sup></u>
Creep Stiffness, AASHTO T 313-19	S (Stiffness), @ 60 sec. m-value, @ 60 sec.	Maximum 300 MPa Minimum 0.300
$\Delta T_c$ , ASTM D7643-16	20 hours PAV aging S (Stiffness), @ 60 sec. m-value, @ 60 sec.	$\Delta T_c \geq -5.0^\circ\text{C}$
<p>(a) Binders with values higher than 3 Pa·s should be used with caution and only after consulting with the supplier as to any special handling procedures, including pumping capabilities.</p> <p>(b) Dynamic Shear Rheometer (AASHTO T 315-19) shall be performed on original binders for the purposes of QC testing only. The original binder <math>G^*/\sin \delta</math> shall be performed at grade temperature. Grade temperature for High Polymer binder is 76°C.</p> <p>(c) The original binder phase angle (AASHTO T 315-19) shall be performed at grade temperature.</p> <p>(d) AASHTO T 315-19 and AASHTO T 350-19 will be performed at a 2-mm gap for PG 76-22 (ARB).</p> <p>(e) All binders with a high temperature designation &gt;67 will be tested at 67°C. PG 76-22 (PMA) and PG 76-22 (ARB) shall pass a “V” grade per AASHTO M 332-19.</p> <p>(f) A maximum <math>J_{nr, diff} = 75\%</math> does not apply for any <math>J_{nr}</math> value <math>\leq 0.50</math> kPa<sup>-1</sup>.</p> <p>(g) For <del>all PG grades of a</del> PG 67 <del>or higher</del>, perform the PAV residue testing at 26.5°C with a maximum of 5,000 kPa.</p> <p>(h) For <del>all PG grades of a</del> PG 76 or higher, perform the PAV residue testing at 26.5°C with a maximum of 6,000 kPa.</p>		



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January 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **929**  
Proposed Specification: **9290100 SUPPLEMENTARY CEMENTITIOUS MATERIALS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim Counts from the State Materials Office to update and clarify language regarding slag, calcined clay, ground glass, and metakaolin in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## SUPPLEMENTARY CEMENTITIOUS MATERIALS

(REV 10-29-20)

ARTICLE 929-1 is expanded by the following:

### 929-1 General.

Supplementary cementitious materials (SCMs) shall conform to the requirements of this Section. SCMs shall be used in concrete mix designs in accordance with Section 346.

Fly ash, slag cement, and ultra-fine fly ash shall not be used in conjunction with Type IP or Type IS cements.

Repulvable bags may be accepted by the Engineer, provided a successful demonstration by the producer has indicated complete degradation of the repulvable bags during the mixing operation and before the mix is discharged.

The Engineer may require additional testing beyond the requirements of this Section prior to the acceptance of any SCM sources.

### 929-1.1 Definitions.

The following definitions are applicable to the production and quality control (QC) of SCMs:

1. Approved Laboratory: A laboratory that is currently inspected by the Cement and Concrete Reference Laboratory (CCRL), is actively participating in the CCRL proficiency program and has corrected all deficiencies noted at the time of inspection. The laboratory must authorize the CCRL to send a copy of the final inspection report and proficiency sample results to the State Materials Office (SMO).

2. SCM Producer: Indicates an SCM supplier, including but not limited to a plant, a terminal, or a transfer facility, that has been qualified by the SMO. The Cementitious Materials Production Facility Listing will be maintained by the SMO.

3. Test Report: A certification from the SCM producer showing that the SCM meets the requirements of this Section. The test report must include, at a minimum, the following information:

- a. The Type of SCM.
- b. The production period.
- c. Chemical and physical analysis of the SCM.
- d. The silo numbers where the SCM is stored.
- e. The specific gravity of the SCM.
- f. The approved laboratory that performed all tests.

4. Purchaser: The term “purchaser” in the ASTM requirements shall be taken as the Department.

ARTICLE 929-2 is deleted and the following substituted:

### 929-2 Quality Control Program.

**929-2.1 General:** Develop a Producer QC Program as specified in Section 105.

SCM producers shall submit a proposed QC Plan to the SMO for acceptance.

Complete the Cementitious Materials Producer QC Plan Checklist (Appendix B02) and submit it along with the QC Plan, in a separate file. The checklist can be found on the SMO website:

<https://www.fdot.gov/materials/quality/programs/qualitycontrol/checklists/index.shtm>. In addition to the QC Plan, the SCM producer must submit monthly test reports from an approved laboratory which certifies that the SCM in current production or supply conforms to the requirements of this Section.

SCM producers with an accepted QC Plan will appear on the Cementitious Materials Production Facility Listing.

QC test data that does not comply with the Specification will not be reason for rejection of the material if the SCM producer's QC Plan indicates that material will be diverted and not used for Department projects.

**929-2.2 Sampling and Testing:** Representatives from the Department may take verification samples at the SCM producer's plant, terminal, distribution facility or the concrete production facility. Samples shall be obtained by one of the methods described in FM 5-503. Sample sizes shall be a minimum of one gallon by volume. At the concrete production facility, cementitious samples shall be jointly obtained by the Department inspector and the concrete producer's representative.

Upon request of the Department, the SCM producer shall provide split samples of the cementitious material collected for QC testing. Split samples shall be delivered to the SMO and shall be identified as representing a designated LOT of the SCM.

Notification of failing verification sample test results will be distributed to the SCM producer and concrete producers (if applicable). Split samples of the initial sample may be provided to the SCM producer and concrete producer upon request.

SUBARTICLE 929-3.4.1 is deleted and the following substituted:

**929-3.4.1 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three ~~trial~~**comparison** batches with petroleum coke, bark ash, or Class C fly ash, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. 18 to 22% fly ash replacement.
4. Water/cementitious materials ratio of 0.41.

The following testing shall be performed on each concrete mix, as appropriate.

Table 929-1 Concrete Testing Requirements		
Test Description	Standard Test Method	Test Age
Surface Resistivity	AASHTO T 358	28 days
Compressive Strength	ASTM C39	28 days
Chloride Diffusion	ASTM C1556 or NT Build 443	6 months, 12 months <sup>(1)</sup>
Length Change	ASTM C157	28 days <sup>(2)</sup>
<p>(1) Upon completion of all 28 day and 6 month testing, the SCM producer may present the data to the SMO for acceptance. The 12 month data shall be provided to the SMO upon completion.</p> <p>(2) <u>Follow the Air Storage procedure.</u></p>		

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6 and 12 months of testing.

SUBARTICLE 929-4.1 is deleted and the following substituted:

**929-4.1 General:** Slag cement and reference cement used for determination of slag activity tests shall meet the requirements of ASTM C989. Sampling and testing procedures shall follow the requirements of ASTM C989. ~~Only slag cement Grade 100 and 120 will be permitted.~~

SUBARTICLE 929-5.2.1 is deleted and the following substituted:

**929-5.2.1 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the calcined clay, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. Control batches: Replace 18 to 22% fly ash replacement of the portland cement with Class F fly ash replacement.
4. ~~Water/cementitious materials ratio of 0.41 for the control Comparison batches: +Replaced a portion of portland cement with the necessary amount a quantity of calcined clay sufficient to produce properties comparable to those for the control batches for comparison batches.~~

5. Water/cementitious materials ratio of 0.41

Testing shall be performed in accordance with Table 929-1.

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.

**929-6.2.1 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the ground glass, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. Control batches: Replace 18 to 22% of the portland cement with Class

F fly ash replacement.

4. ~~Water/cementitious materials ratio of 0.41.~~ Comparison batches: Replace a portion of portland cement with a quantity of ground glass sufficient to produce properties comparable to those for the control batches.

5. Water/cementitious materials ratio of 0.41.

Testing shall be performed in accordance with Table 929-1.

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.

SUBARTICLE 929-7.2.2 is deleted and the following substituted:

**929-7.2.2 Acceptance Testing of Metakaolin:** Acceptance of metakaolin from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C618 Class N, as modified herein, and this Section.

~~Metakaolin may be used in concrete if the test results provide an improvement or comparable compressive strength, sulfate resistance, corrosion protective properties, and other durability requirements of concrete, when compared to ASTM C618 Class F fly ash concrete.~~

SUBARTICLE 929-7.2.3 is deleted.

~~**929-7.2.3 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the metakaolin, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:~~

- ~~1. Use a previously approved FDOT Class IV (5,500 psi) mix design.~~
- ~~2. Size No. 57 Coarse Aggregate from an approved FDOT source.~~
- ~~3. 18 to 22% fly ash replacement.~~
- ~~4. Water/cementitious materials ratio of 0.41.~~

~~Testing shall be performed in accordance with Table 929-1.~~

~~Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **948**  
Proposed Specification: **9480000 OPTIONAL DRAINAGE PRODUCTS AND  
LINER REPAIR SYSTEMS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the State Construction Office to clarify and/or delete references to the term "liner" in all repair methods in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**OPTIONAL DRAINAGE PRODUCTS AND LINER REPAIR SYSTEMS  
(REV 11-12-20)**

SECTION 948 is deleted and the following substituted:

**SECTION 948  
OPTIONAL DRAINAGE PRODUCTS AND  
LINER REPAIR SYSTEMS**

**948-1 Polyvinyl-Chloride (PVC) Pipe, or Acrylonitrile-Butadiene-Styrene (ABS) Plastics Pipe.**

**948-1.1 For Bridge Drains:** PVC pipe shall conform to the requirements of ASTM D1785, for Type I, Grade 1, Schedule 80 PVC pipe with a minimum polymer cell classification of 12454 per ASTM D1784 and a minimum of 1.5% by weight of titanium dioxide for UV protection.

**948-1.2 Pressure Pipe:** Pressure pipe for direct burial under pavement shall conform to the requirements of ASTM D1785, for Type I, Grade I, Schedule 40, for sizes up to and including 2-1/2 inches, and Schedule 80 for sizes up to 4 inches. Pressure pipe 4 inches in diameter and larger shall conform to the requirements of AWWA C900-75, DR18, and ASTM D1785, Type I, Grade I or other types as may be specifically called for in the Plans or Special Provisions.

**948-1.3 Pipe Marking:** All PVC pipe shall be marked as required by Article 8 of ASTM D1785, and acceptance of the pipe may be based on this data.

**948-1.4 Nonpressure Pipe:** PVC pipe and ABS pipe intended for direct-burial or concrete encasement, shall meet the following requirements:

1. PVC Pipe: ASTM D3034, SDR-35, or ASTM F949, profile wall without perforations.

2. ABS Pipe: ASTM D2680.

The manufacturer of the PVC or ABS pipe shall submit to the Engineer the mill analysis covering chemical and physical test results.

**948-1.5 Underdrain:** PVC pipe for use as underdrain shall conform to the requirements of ASTM F758 or ASTM F949. Also, PVC underdrain manufactured from PVC pipe meeting ASTM D3034, perforated in accordance with the perforation requirements given in AASHTO M36 or AASHTO M196 will be permitted.

**948-1.6 Edgedrain:** PVC pipe for use as edgedrain shall conform to the requirements of ASTM F758, ASTM F949 or ASTM D3034 pipe shall be perforated in accordance with the perforation requirements given in AASHTO M36 or AASHTO M196. Additional perforations will be required as indicated in Standard Plans, Index 446-001 for pipes designated under ASTM F758 and ASTM D3034. PVC pipe intended for direct burial in asphalt shall meet the following requirements:

1. ASTM D3034, SDR-35, or ASTM F949

2. NEMA TC-2 (pipe material and compounds) and NEMA TC-3 (pipe fittings) for PVC (90°C electrical conduit pipe) NEMA ECP-40 and NEMA ECP-80. Underwriter Laboratory Specifications referenced under NEMA specifications for electrical conductivity are not required.

3. Pipe shall withstand asphalt placement temperatures specified without permanent deformation.

4. Perforations shall be in accordance with AASHTO M36 or AASHTO M196.

**948-1.7 PVC Pipe (12 Inches to 48 Inches):** PVC pipe for side drain, cross drain, storm drain and other specified applications shall conform to AASHTO M278 for smooth wall PVC pipe or ASTM F949 and AASHTO M304 for PVC ribbed pipe with plant certification from the National Transportation Product Evaluation Program (NTPEP). Resin shall contain a minimum of 1.5% by weight of titanium dioxide for UV protection. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of PVC.

PVC pipe shall be installed within two years from the date of manufacture.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-1.7.1 Material Acceptance:** Prior to use, submit to the Engineer a material certification from the manufacturer confirming that the requirements of this Section are met. The certification shall conform to the requirements of Section 6.

Project sampling shall be performed in accordance with 430-9.

## **948-2 Corrugated Polyethylene Tubing and Pipe.**

**948-2.1 General:** For underdrain, corrugated polyethylene tubing and fittings shall meet the requirements of AASHTO M252. For edgedrain, corrugated polyethylene tubing and fittings shall meet the requirements of AASHTO M252, except as modified in 948-2.2. For storm drain side drain, french drain and cross drain corrugated polyethylene pipe shall meet the requirements of AASHTO M-294 and 948-2.3.

The tubing or pipe shall not be left exposed to sunlight for periods exceeding the manufacturer's recommendation.

**948-2.2 Edgedrain (4 Inches to 10 Inches):** The requirements for edgedrain as specified in AASHTO M-252 are modified as follows:

1. Coiling of tubing 6 inches in diameter or greater is not permitted. Tubing shall have a minimum pipe stiffness of 46 psi at 5% deflection.

### **948-2.3 Corrugated High Density Polyethylene (HDPE) Pipe (12 Inches to 60 Inches):**

**948-2.3.1 General:** Class I (50-year design service life) corrugated HDPE pipe used for side drain, storm and cross drain or french drain shall meet the requirements of AASHTO M294(V) with plant certification from the NTPEP. Corrugations shall be annular. Pipe resin shall conform to ASTM D3350 with a minimum cell classification 435400C and between 2% to 4% carbon black. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of polyethylene.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-2.3.2 Additional Requirements for Class II (100-Year Design Service Life), Type S HDPE Pipe:** Class II HDPE pipe shall meet the requirements in Table 948-1 in addition to those in 948-2.3. Perforations will not be allowed. Manufacturers may only use ground Class II HDPE pipe for reworked plastic.

Table 948-1 Stress Crack Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner	FM 5-572, Procedure A	10% Igepal solution at 122°F and 600 psi applied stress, 5 replicates	Average failure time of the pipe liner shall be ≥18.0 hours, no single value shall be less than 13.0 hours.
Pipe Corrugation <sup>(1)</sup> , (molded plaque)	ASTM F2136	10% Igepal solution at 122°F and 600 psi applied stress, 5 replicates	Average failure time shall be ≥24.0 hours, no single value shall be less than 17.0 hours.
Junction	FM 5-572, Procedure B and FM 5-573	Full Test <sup>(2)(3)</sup> Test at 3 temperature/stress combinations: 176°F at 650 psi 176°F at 450 psi 158°F at 650 psi; 5 replicates at each test condition	Determine failure time at 500 psi at 73.4°F ≥ 100 years (95% lower confidence) using 15 failure time values <sup>(4)</sup> The tests for each condition can be terminated at duration equal to or greater than the following criteria: 110.0 hr at 176°F 650 psi 430.0 hr at 176°F 450 psi 500.0 hr at 158°F 650 psi
		Single Test <sup>(5)</sup> : Test temperature 176°F and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110.0 hr
Longitudinal Profiles <sup>(6)</sup>	FM 5-572, Procedure C, and FM 5-573	Full Test <sup>(2)(3)</sup> : Test at 3 temperature/stress combinations: 176°F at 650 psi 176°F at 450 psi 158°F at 650 psi; 5 replicates at each test condition	Determine failure time at 500psi at 73.4°F ≥ 100 years (95% lower confidence) using 15 failure time values <sup>(4)</sup> . The tests for each condition can be terminated at duration equal to or greater than the following criteria: 110.0 hr at 176°F 650 psi 430.0 hr at 176°F 450 psi 500.0 hr at 158°F 650 psi
		Single Test <sup>(5)</sup> : Test temperature 176°F and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110.0 hr (no value shall be less than 55.0 hours)
Oxidation Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement



Liner and/or Crown <sup>(7)</sup>	OIT Test (ASTM D3895)	2 replicates (to determine initial OIT value) on the as manufactured (not incubated) pipe.	25.0 minutes, minimum
Liner and/or Crown <sup>(7)</sup>	Incubation test FM 5-574 and OIT test (ASTM D3895)	Three samples for incubation of 265 days at 176°F <sup>(8)</sup> and applied stress of 250 psi. One OIT test per each sample	Average of 3.0 minutes <sup>(9)</sup> (no values shall be less than 2.0 minutes)
Liner and/or Crown <sup>(7)</sup>	MI test (ASTM D1238 at 190°C/2.16Kg)	2 replicates on the as manufactured (not incubated) pipe.	< 0.4 g/10 minutes
Liner and/or Crown <sup>(7)</sup>	Incubation test FM 5-574 and MI test (ASTM D1238 at 190°C/2.16Kg)	2 replicates on the three aged sampled after incubation of 265 days at 176°F <sup>(8)</sup> and applied stress of 250 psi	MI Retained Value <sup>(9)(10)</sup> shall be greater than 80% and less than 120%.

Note: FM = Florida Method of Test.

(1) Required only when the resin used in the corrugation is different than that of the liner.

(2) A higher test temperature (194°F) may be used if supporting test data acceptable to the State Materials Engineer is submitted and approved in writing.

(3) Full test shall be performed on alternative pipe diameter of pipe based on wall profile design, raw material cell classification, and manufacturing process. Full test must be performed on maximum and minimum pipe diameters within a manufacturing process.

(4) Computer program to predict the 100 year SCR with 95% lower confidence can be obtained from FDOT.

(5) Single test for the junction and longitudinal profile may be used on alternating pipe sizes within a manufacturing process.

Single point tests may not be used on maximum and minimum pipe sizes within a manufacturing process except by approval of the Engineer. Single point tests may be used for quality assurance testing purposes.

(6) Longitudinal profiles include vent holes and molded lines.

(7) OIT and MI tests on the crown are required when resin used in the corrugation is different than that of the liner.

(8) The incubation temperature and duration can also be 196 days at 185°F.

(9) The tests for incubated and "as-manufactured" pipe samples shall be performed by the same lab, same operator, the same testing device, and in the same day.

(10) The MI retained value is determined using the average MI value of incubated sample divided by the average MI value of as-manufactured pipe sample.

### 948-2.3.3 Material Acceptance: Meet the requirements of 948-1.7.1.

**948-2.3.4 Laboratory Accreditation:** Manufacturers seeking evaluation of a product in accordance with Departmental procedures must submit test reports conducted by a laboratory qualified by the Geosynthetic Accreditation Institute-Laboratory Accreditation Program (GAI-LAP) or qualified by ISO 17025 accreditation agency using personnel with actual experience running the test methods for Class II HDPE pipe. Submit the test reports to the State Materials Office.

### 948-2.4 Steel Reinforced Polyethylene Ribbed Pipe:

**948-2.4.1 General:** Steel reinforced polyethylene ribbed pipe used for side drain, storm and cross drain, or french drain shall meet the requirements of AASHTO M335 with plant certification from the NTPEP and the testing requirements for stress crack and oxidation resistance in Table 948-1. Pipe resin shall conform to ASTM D3350 with a minimum cell classification 435400C and between 2% to 4% carbon black. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of steel reinforced polyethylene ribbed pipe.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-2.4.2 Material Acceptance:** Meet the requirements of 948-1.7.1.

**948-2.4.3 Laboratory Accreditation:** Meet the requirements of 948-2.3.4 except use personnel with actual experience running the test methods for steel reinforced polyethylene ribbed pipe.

### **948-3 Fiberglass Reinforced Polymer Pipe.**

**948-3.1 For Bridge Drains:** Fiberglass pipe shall conform to the requirements of ASTM D3262, ASTM D2996 or ASTM D2310, for Type I, Grade 2, Class E, using polyvinyl ester as the only resin. The minimum hoop stress designation shall be A. The resin shall contain UV stabilizers or a two-part 100% solids polyurethane coating.

### **948-4 Ductile Iron Pipe.**

**948-4.1 For Bridge Drains:** Ductile iron pipe shall conform to the requirements of AWWA C151.

### **948-5 Hot Dip Galvanized Steel Pipe.**

**948-5.1 For Bridge Drains:** Hot dip galvanized steel pipe shall conform to the requirements of ASTM A53.

### **948-6 Flexible Transition Couplings and Pipe.**

**948-6.1 For Bridge Drains:** Flexible transition couplers and pipe shall conform to the requirements of ASTM C1173.

### **948-7 Profile Wall Polypropylene (PP) Pipe (12 Inches to 60 Inches).**

**948-7.1 Class I PP:** Class I (50-year design service life) PP pipe used for side drain, cross drain, storm drain, and french drain shall meet the requirements of AASHTO M330 with plant certification from the NTPEP. Corrugations shall be annular. Polypropylene compound shall conform to the requirements of ASTM F2881. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of polypropylene.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-7.2 Additional Requirements for Class II (100-Year Design Service Life) PP Pipe:** Meet the requirements in Table 948-2 in addition to those in 948-7.1. Manufacturers may only use ground Class II PP for reworked plastic.

Table 948-2 Stress Crack Resistance			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner	FM 5-572, Procedure A	10% Igepal solution at 50°C and 600 psi applied stress, 5 replicates	Average failure time of the pipe liner shall be ≥100 hours, no single value shall be less than 71 hours. <sup>(1)</sup>
Oxidation Resistance			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner and/or Crown <sup>(2)</sup>	OIT Test (ASTM D3895)	2 replicates (to determine initial OIT value) on the as manufactured (not incubated) pipe.	25.0 minutes, minimum
Pipe Liner and/or Crown <sup>(2)</sup>	Incubation test FM 5-574 and OIT test (ASTM D3895)	Three samples for incubation of 264 days at 85°C <sup>(3)</sup> . One OIT test per each sample	Average of 3.0 minutes <sup>(4)</sup> (no values shall be less than 2.0 minutes)
Pipe Liner and/or Crown <sup>(2)</sup>	MI test (ASTM D1238 at 230°C/2.16Kg)	2 replicates on the as manufactured (not incubated) pipe.	< 1.5 g/10 minutes
Pipe Liner and/or Crown <sup>(2)</sup>	Incubation test FM 5-574 and MI test (ASTM D1238 at 230°C/2.16Kg)	2 replicates on the three aged sampled after incubation of 264 days at 85°C <sup>(3)</sup>	MI Retained Value <sup>(4)(5)(6)</sup> shall be greater than 80% and less than 120%.

Note: FM = Florida Method of Test.

(1) If due to sample size this test cannot be completed on the liner then testing shall be conducted on a molded plaque sample. Samples can be removed if test time exceeds 100 hours without failure.

(2) OIT and MI tests on the crown are required when resin used in the corrugation is different than that of the liner.

(3) The incubation temperature and duration can also be 192 days at 90°C or 140 days at 95°C.

(4) The tests for incubated and "as-manufactured" pipe samples shall be performed by the same lab, same operator, the same testing device, and in the same day.

(5) Within each replicate set of tests, the discrepancy range shall be within 9%. If an out-of-range discrepancy occurs, repeat the two MI tests on the same pipe sample. If insufficient material is available, a repeat of one test is acceptable.

(6) The MI retained value is determined using the average MI value of incubated sample divided by the average MI value of as-manufactured pipe sample.

**948-7.3 Material Acceptance:** Meet the requirements of 948-1.7.1.

**948-7.4 Laboratory Accreditation:** Meet the requirements of 948-2.3.4 except use personnel with actual experience running the test methods for profile wall polypropylene pipe.

**948-8 Filter Fabric Sock for Use with Underdrain.**

For Type I underdrain specified in Standard Plans, Index 440-001, filter sock shall be an approved strong rough porous, polyester or other approved knitted fabric which completely covers and is secured to the perforated plastic tubing underdrain in such a way as to prevent infiltration of trench backfill material.

The knitted fabric sock shall be a continuous one piece material that fits over the tubing like a sleeve. It shall be knitted of continuous 150 denier yarn and shall be free from any chemical treatment or coating that might significantly reduce porosity and permeability.

The knitted fabric sock shall comply with the following physical properties:

Table 948-3		
Weight, applied (oz/sq. yd.)	3.5 min	ASTM D3887
Grab tensile strength (lbs.)	50 min.*	ASTM D5034
Equivalent opening size (EOS No.)	25 min.**	Corps of Engineers CW-02215-77
Burst strength (psi)	100 min.**	ASTM D3887
*Tested wet.		
**Manufacturer's certification to meet test requirement.		

The knitted fabric sock shall be applied to the tubing in the shop so as to maintain a uniform applied weight. The tubing with knitted fabric sock shall be delivered to the job site in such manner as to facilitate handling and incorporation into the work without damage. The knitted fabric sock shall be stored in UV resistant bags until just prior to installation. Torn or punctured knitted fabric sock shall not be used.

#### **948-9 Liner Repair Systems for Rehabilitation of Pipe and Other Drainage Structures.**

**948-9.1 General:** Liner Repair systems shall have at least the minimum stiffness required for the intended application in accordance with the AASHTO LRFD Bridge Design Specifications.

**948-9.2 Folded Liner:** Folded liner shall be manufactured in an out of form state, usually collapsed circumferentially, and folded on the long axis. After installation in a host structure, the liner is formed by means of heat and pressure to fit the host structure. When installed, folded liner shall extend from one structure to the next in one continuous length with no intermediate joints.

**948-9.2.1 Polyethylene:** Folded polyethylene liner shall meet the requirements of ASTM 2718 or ASTM F714 with a minimum cell classification of 335420 and between 2% to 4% carbon black.

**948-9.2.2 PVC:** Folded PVC liner shall meet the requirements of ASTM F1504 (meet all the requirements for cell classification 12334 or 13223) or ASTM F1871 (meet all the requirements for cell classification 12111).

**948-9.2.3 Cured-In-Place:** Folded resin impregnated flexible tubing shall meet the requirements of ASTM F1216 and ASTM D5813.

**948-9.3 Prefabricated (Slip) Pipe Liner:** When used in slip lining applications, prefabricated liner shall be round, flexible or semi-rigid liner, manufactured in lengths that may be joined in a manhole or access pit before insertion in a host pipe.

##### **948-9.3.1 Polyethylene:**

1. Solid wall polyethylene pipe liner shall meet the requirements of ASTM F714 or AASHTO M326 and shall have a minimum cell classification of 345464 and between 2% to 4% carbon black.

2. Profile wall polyethylene pipe liner shall meet the requirements of AASHTO M294 and shall have a minimum cell classification of 435400 and between 2% to 4% carbon black

3. Steel reinforced polyethylene pipe liner shall meet the requirements of AASHTO MP20-13, ASTM F2562 or ASTM F2435 and shall have a minimum cell classification of 334452 and between 2% to 4% carbon black.

**948-9.3.2 PVC:**

1. Solid wall PVC pipe liner shall meet the requirements of ASTM D2729 and shall have a minimum cell classification of 12454.

2. Profile wall PVC pipe liner shall meet the requirements of ASTM F794, ASTM F949, or AASHTO M304 and shall have a minimum cell classification of 12454.

**948-9-3.3 Fiberglass:** Prefabricated fiberglass pipe liner shall meet the requirements of ASTM D3262.

**948-9.4 Spiral-Wound Liner:** Spiral-wound liner shall consist of coils of profile strips or one piece profile strips that are wound directly into a host pipe helically

**948-9.4.1 Polyethylene:** Polyethylene spiral-wound liner shall meet the requirements of ASTM F1697 or ASTM F1735, except the resin shall conform to ASTM D3350 with a minimum cell classification of 335420 and between 2% to 4% carbon black.

**948-9.4.2 PVC:** PVC spiral-wound liner shall meet the requirements of ASTM F1697 or ASTM F1735 and shall have a minimum cell classification of 12454.

**948-9.4.3 Steel Reinforced:** Steel reinforced spiral-wound liner shall meet the requirements of ASTM F1697 or ASTM F1735, except the resin shall conform to ASTM D3350 with a minimum cell classification of 335420 and between 2% to 4% carbon black. The steel reinforcement shall be fully encapsulated to prevent exposure to corrosive elements.

**948-9.5 Segmental Panel Liner:** Segmental panel liner consists of custom fit flat or curved panels that are formed to the inside wall of a host structure.

**948-9.5.1 Polyethylene:** Polyethylene segmental panel liner shall meet the requirements of ASTM F1735, except the resin shall conform to ASTM D3350 with a minimum cell classification of 345464 and between 2% to 4% carbon black.

**948-9.5.2 PVC:** PVC segmental panel liner shall meet the requirements of ASTM F1735 and shall have a minimum cell classification of 12454.

**948-9.6 Point Repair Liner Systems:** Point repair liner systems may be used to repair and rehabilitate an isolated portion of an existing structure and may consist of any materials covered by this specification. Materials that shall be used as primary components of point repair apparatus are:

1. Stainless steel, which shall meet the requirements of AASHTO M167M, ASTM A167, or ASTM A240
2. Aluminum, which shall meet the requirements of AASHTO M196
3. Rubber, which shall meet the requirements of ASTM C923.

**948-9.7 Spray Applied Liner Repair Systems:** Spray applied liners repair systems consist of liquid, slurry, foam or gel that is sprayed over the interior surface or injected into specific locations of an existing structure or pipe to rehabilitate it, with or without fiber reinforcement. Spray applied liner repair system installers shall submit to the Department proof of experience for on-site supervision and previously completed contracts including the following:

1. Project name and location
2. Names of contracting parties
3. Owner's names
4. A brief description of the work

5. Dates of completion of spray applied liner work

Materials that may be used for spray applied lining are:

1. Hydrophilic urethane-based foams or gels which shall meet the requirements of ASTM F2414.
2. Epoxy resins and unsaturated styrene-based resins which shall meet the resin material requirements of ASTM F1216.
3. Cementitious materials, as recommended by the manufacturer, including: annular backfill, low density cellular concrete, shotcrete, gunite, centrifugally cast, and pre-packaged grout.
4. High-strength, low-porosity geopolymer materials, as recommended by the manufacturer.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **955**  
Proposed Specification: **9550000 Timber Treatment (Including Treating Materials).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim McCullough from the State Materials Office to implement the requirements for treatment of timber, verify certifications when arrived on job-site or in the Department's database.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**TIMBER TREATMENT  
(INCLUDING TREATING MATERIALS)  
(REV 10-20-20)**

SECTION 955 is deleted and the following substituted:

**955-1 General.**

The work specified in this Section is the treating of structural timber, timber piling and timber posts, bracing and railing. The method of treatment and determination of assay results for all such timber materials shall be in accordance with ~~AASHTO M-133~~, ~~or~~ American Wood Protection Association (AWPA) Use Category System (UCS) - U1, with the exceptions and additions as specified herein. Use approved producers listed on the Department's Production Facility Listing for timber components located in <https://mac.fdot.gov/smreports>. Producers seeking inclusion shall meet the requirements of Section 105.

**955-2 Preservative.**

~~955-2.1 Salt or Brackish Water Use: The treating of Southern Yellow Pine (SYP) lumber or timber for use in salt or brackish water environments shall be done with Chromated Copper Arsenate (CCA) in accordance with AWPA U1.~~ **Guardrail Post, Fence Post, Bracing and Railing on Pedestrian Bridges, Buildings, and Rest Areas in Above Ground, Ground Contact, Fresh Water Immersion Applications (Pedestrian Use):** Provide guardrail post, fence post, bracing and railing in accordance with Table 955-1. Approved producers should provide a certification showing the treatment and assay results with every shipment.

<u>Table 955-1</u>				
<u>Product</u>	<u>Type / Species</u>	<u>Category</u>	<u>Treatment</u>	<u>Assay Results</u>
<u>Guardrail Posts, Fence Post, Bracing, &amp; Railing</u>	<u>Southern Yellow Pine</u>	<u>UC4A</u>	<u>Micronized Copper Azole (MCA)</u>	<u>≥ 2.4 kg/m<sup>3</sup> or ≥ 0.15 pcf</u>
			<u>Copper Azole Type C (CA-C)</u>	
			<u>Copper Azole Type B (CA-B)</u>	<u>≥ 3.3 kg/m<sup>3</sup> or ≥ 0.21 pcf</u>
			<u>Alkaline Copper Quat Type A, (ACQ-A)</u>	<u>≥ 6.4 kg/m<sup>3</sup> or ≥ 0.40 pcf</u>
<u>Alkaline Copper Quat Type B, (ACQ-B)</u>				



			<u>Alkaline Copper Quat Type C, (ACQ-C)</u>	
			<u>Alkaline Copper Quat Type D, (ACQ-D)</u>	

**955-2.2 Above Ground or Ground Contact and Fresh Water Immersion Use:** The treating of SYP lumber and timber for above ground or ground contact and fresh water immersion applications, shall be done with, Ammoniacal Copper Zinc Arsenate (ACZA), Copper Azole (CA), Micronized Copper Azole (MCA), Alkaline Copper Quat (ACQ), Micronized Copper Quat (MCQ), or CCA, with the following exceptions:

————— Treatment of the wood products of the pedestrian bridges, wood rails at buildings or rest areas, and fence posts shall be done either with CA, MCA, or ACQ. **Guardrail Posts, Fence Posts, Bracing and Sheet Piling in Above Ground, Ground Contact or Fresh Water Immersion Applications (Non-Pedestrian Use).** Provide guardrail post, fence post, bracing and sheet piling in accordance with Table 955-2. Approved producers should provide a certification showing the treatment and assay results with every shipment.

<u>Table 955-2</u>				
<u>Product</u>	<u>Type / Species</u>	<u>Category</u>	<u>Treatment</u>	<u>Assay Results</u>
<u>Guardrail Posts, Fence Post, Bracing</u>	<u>Southern Yellow Pine</u>	<u>UC4A</u>	<u>MCA</u>	<u>≥ 2.4 kg/m<sup>3</sup> or ≥ 0.15 pcf</u>
			<u>CA-C</u>	
			<u>CA-B</u>	
			<u>Ammoniacal Copper Zinc Arsenate (ACZA)</u>	<u>≥ 6.4 kg/m<sup>3</sup> or ≥ 0.40 pcf</u>
			<u>Chromated Copper Arsenate Type C (CCA)</u>	
<u>ACQ-A ACQ-B ACQ-C ACQ-D</u>				
<u>Piling</u>	<u>Cypress</u>		<u>None</u>	<u>N/A</u>
	<u>Southern Yellow Pine</u>	<u>UC4B UC4C</u>	<u>ACZA</u>	<u>≥ 9.6 kg/m<sup>3</sup> or ≥ 0.60 pcf</u>
			<u>CCA</u>	<u>≥ 9.6 kg/m<sup>3</sup> or ≥ 0.60 pcf</u>

	<u>Pacific Coast Douglas Fir</u>		<u>ACZA</u>	<u><math>\geq 9.6 \text{ kg/m}^3</math> or <math>\geq 0.60 \text{ pcf}</math></u>
--	----------------------------------	--	-------------	---

**955-2.3 Guardrail Post, Fence Post, Bracing and Sheet Piling for Salt and Brackish Water Applications (Non-Pedestrian).** Provide guardrail post, fence post, bracing and sheet piling in accordance with this section and Table 955-3. Approved producers should provide a certification showing the treatment and assay results with every shipment.

<u>Table 955-3</u>				
<u>Product</u>	<u>Type / Species</u>	<u>Category</u>	<u>Treatment</u>	<u>Assay Results</u>
<u>Guardrail Posts, Fence Post, Bracing</u>	<u>Southern Yellow Pine</u>	<u>UC4C</u>	<u>CCA</u>	<u><math>\geq 9.6 \text{ kg/m}^3</math> or <math>\geq 0.60 \text{ pcf}</math></u>
<u>Piling</u>	<u>Cypress</u>	<u>UC5C</u>	<u>None</u>	<u>N/A</u>
	<u>Southern Yellow Pine</u>		<u>CCA</u>	<u>Zone 1 (Outer):</u> <u><math>\geq 40 \text{ kg/m}^3</math> or <math>\geq 2.50 \text{ pcf}</math></u> <u>Zone 2 (Inner):</u> <u><math>\geq 24 \text{ kg/m}^3</math> or <math>\geq 1.50 \text{ pcf}</math></u>
	<u>Pacific Coast Douglas Fir</u>		<u>ACZA</u>	<u><math>40 \text{ kg/m}^3</math> or <math>\geq 2.50 \text{ pcf}</math></u>

**955-2.4 Structural Timber:** Provide structural timber in accordance with this section and Table 955-4. Approved producers should provide a certification showing the treatment and assay results with every shipment.

<u>Table 955-4</u>				
<u>Product</u>	<u>Type / Species</u>	<u>Category</u>	<u>Treatment</u>	<u>Assay Results</u>
<u>Boards, Dimensional, Timber</u>	<u>Southern Yellow Pine</u>	<u>UC4B</u>	<u>CCA</u>	<u><math>\geq 9.6 \text{ kg/m}^3</math> or <math>\geq 0.60 \text{ pcf}</math></u>

### **955-3 Process.**

— All timber and lumber items shall be treated in accordance with AWP A T1.

### **955-4 Requirements for Preservative Materials.**

— ACQ, CCA, CA, MCA and ACZA shall be in accordance with the appropriate AWP A P Standard. MCA shall be in accordance with the appropriate ICC Evaluation Service (ICC-ES) ESR Report.

### **955-5 Requirements for Retention.**

— **955-5.1 Piling:** All pilings shall be treated in accordance with AWP A U1.

— **955-5.2 Structural Timber and Sheet Piles:** All structural timber and sheet piles shall be treated in accordance with AWP A U1.

— **955-5.3 Posts:** All posts shall be treated in accordance with AWP A U1.

~~955-5.4 Determination of Retention: Retention shall be determined by assay performed and certified by the treating company in accordance with the applicable AWPA standards.~~

~~955-6 Penetration Requirements.~~

~~The penetration of the treatment shall be in accordance with AWPA T1.~~

**955-37 Handling Waterborne Preservative Treated Piling.**

In handling of piles that have been treated with chromated copper arsenate (CCA) or ammoniacal copper zinc arsenate (ACZA), cable slings shall be used. Mechanical grabbers or pointed tools shall not be permitted. Rough or careless handling shall be avoided at all times.

**955-48 Identification of Treating Plants for Round Piling.**

The treating plant shall brand, or place a distinctive permanent mark, on each round pile, approximately 6 feet from the butt end, such that the plant responsible for the treatment can be readily determined at any time during the service life of the piling.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 7, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **965**  
Proposed Specification: **9650500 General Provisions for Aluminum Items (Including Welding).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the State Construction Office to include paint requirements for aluminum light poles, pedestals, and posts.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GENERAL PROVISIONS FOR ALUMINUM ITEMS  
(INCLUDING WELDING)  
(REV 11-10-20)**

SECTION 965 is expanded by the following new Article:

**965-5 Paint for Poles, Pedestals, and Posts**

Paint systems used on aluminum poles, pedestals, and posts shall meet the color requirements as specified in the Contract Documents. All paint systems shall possess physical properties and handling characteristics that are compatible with the application requirements of Section 646. Materials shall be specifically intended for use over aluminum. Paint systems shall exhibit no loss of adhesion or total color difference ( $\Delta E^*_{ab}$ ) greater than 8.0 units for five years after final acceptance as specified in 5-11. An aluminum pole, pedestal, post, or sign panel that exhibits a cumulative surface area of delamination in excess of 50 square inches will constitute an adhesion failure. Delamination shall be defined as any area of exposed metal surface subsequent to hand tool cleaning. A  $\Delta E^*_{ab}$  value exceeding 8.0 units per the International Commission on Illumination  $L^*a^*b^*$  1976 (CIELAB) space and color difference formula, measured in accordance with ASTM D2244, will constitute a color retention failure.

The Department will measure and enter in the Department's database the CIELAB color chromaticity coordinates for the color of the top coat of sample coupons provided as required by 646-2.7 using a BYK-Gardner Handicolor colorimeter using D65 illuminant and 2-degree geometry settings. The Department-measured CIELAB chromaticity coordinates shall define the initial color and will be used for resolution of color retention failures and the resolution of color retention disputes.



*Florida Department of Transportation*

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GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 28, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **967**  
Proposed Specification: **9670000 Components for Guardrail.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim McCullough from the State Materials Office to eliminate confusion on the order of delivery and ability to verify material prior to installation.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**COMPONENTS FOR GUARDRAIL**(REV ~~12-1423-210~~)

SECTION 967 is deleted and the following substituted:

**967-1 General Description.**

This Section covers the material and fabrication requirements for guardrail components. All timber and steel components supplied under this Specification shall be from producers currently on the Department's Production Facility Listing. Producers seeking inclusion on the Department's Production Facility Listing must meet the requirements of Section 105.

**967-2 Timber Posts and Timber Offset Blocks Materials.**

~~All timber and steel components supplied under this Specification shall be from producers currently on the Department's Production Facility Listing. Producers seeking inclusion on the Department's Production Facility Listing must meet the requirements of Section 105.~~

~~967-2.1 Timber:~~ Timber products must have a minimum stress grade of 1200 psi and meet the material requirements of Section 954. Timber is to be dressed on four sides (S4S) and treated in accordance with the post requirements in Section 955. Timber posts and offset blocks shall be shaped and drilled prior to wood treatment. Posts shall not vary more than 1 inch and offset blocks shall not vary more than 0.25 inches from the specified dimensions shown in the Standard Plans.

**967-3 Steel Components**

~~967-2.2 Steel: Steel guardrail materials must meet the component fabrication requirements in 967-3.~~

~~Steel materials must meet the requirements of Table 967-1 below.~~

Production facilities must submit certified mill analyses to the Department for review and approval. Certified mill analyses must be signed by a quality control representative, describe each lot of components, and show compliance with Table 967-1.

All steel components must be melted and manufactured in the United States. The certified mill analysis must show that the included material meets the Buy America, Source of Supply-Steel requirements in Section 6.

Where specified, components must be welded in accordance with the American Welding Society Structural Welding Code ANSI/AWS D1.1 using material conforming to E60XX. Nondestructive testing of welds is not required.

<u>Product</u>	<u>Standard</u>	<u>Grade / Type</u>	<u>Style</u>	<u>Reportable Properties</u>
<u>Steel Panels</u>	<u>AASHTO M-180</u>	<u>Type 2</u>	<u>W-Beam</u>	<u>Heat, Yield, Tensile, Elongation, Class, Type</u>
		<u>Class A (12 Ga.)</u>	<u>Thrie-Beam</u>	
		<u>Class B (10 Ga.)</u>	<u>Thrie-Beam Transition</u>	

<u>Table 967-1</u> <u>Material Requirements for Steel Guardrail Components</u>				
<u>End Pieces</u>	<u>AASHTO M-180</u>	<u>Type 2 Class A (12 Ga.) Class B (10 Ga.)</u>	<u>All</u>	<u>Yield, Tensile, Class, Type</u>
<u>Steel Posts &amp; Offset Blocks</u>	<u>ASTM A36</u>	<u>36</u>	<u>All</u>	<u>Killed, Yield, Tensile, Elongation</u>
	<u>ASTM A992</u>	<u>50</u>	<u>All</u>	
<u>Rub Rail</u>	<u>AASHTO M-180</u>	<u>Type 2 Class A (12 Ga.) Class B (10 Ga.)</u>	<u>All</u>	<u>Heat, Yield, Tensile, Elongation, Class, Type</u>
<u>Pipe Rail</u>	<u>ASTM A53</u>	<u>A, B</u>	<u>E, S</u>	<u>Grade, Finish</u>
<u>Steel Tube Foundations</u>	<u>ASTM A500</u>	<u>B</u>	<u>Round, Shaped</u>	<u>Composition, Yield, Tensile, Elongation</u>
<u>Brackets &amp; Fixtures</u>	<u>ASTM A36</u>	<u>36</u>	<u>All</u>	<u>Killed, Yield, Tensile, Elongation</u>
<u>Bolts</u>	<u>ASTM A307</u>	<u>A, B</u>	<u>Button-Head</u>	<u>Size, Composition, Hardness, Tensile</u>
			<u>Hex</u>	
			<u>Heavy-Hex</u>	
<u>Nuts</u>	<u>ASTM A563</u>	<u>A, B, C, C3, D, DH, DH3</u>	<u>Heavy Hex</u>	<u>Size, Composition, Proof Load, Hardness</u>
<u>Washers</u>	<u>ASTM F436</u>	<u>1, 3</u>	<u>Circular, Beveled, Clipped, Extra Thick</u>	<u>Size, Hardness</u>

**967-3 Fabrication.**

~~967-3.1 Posts: Posts shall not vary more than 1 inch from the specified length shown in the Standard Plans.~~

~~967-3.1.1 Timber Posts: Posts shall be shaped and drilled prior to wood treatment.~~

~~967-3.1.2 Steel Posts, Special Steel Posts, Steel Offset Blocks, and Rub Rail: Posts must conform to the requirements of ASTM A6, ASTM A36 or ASTM A992. Posts must be fabricated from rolled sections with cross-sections defined in the American Institute of Steel Construction (AISC) Manual of Steel Construction. Complete all fabrication prior to galvanizing. Galvanizing shall have the composition that meets or exceeds "Prime Western Grade" in accordance with ASTM B6. Posts must be drilled or punched prior to galvanizing in accordance with ASTM A123. Posts shall not vary more than 1 inch and offset blocks shall not vary more than 0.25 inches from the specified dimensions shown in the Standard Plans.~~



~~967-3.2 Special Steel Posts:~~ Posts and plate materials must meet the requirements of ASTM A6 and ASTM A36. Posts and plates must be drilled, punched, and welded prior to galvanizing in accordance with ASTM A123.

~~967-3.3 Offset Blocks:~~ Offset blocks must not vary more than 0.25 inch from the specified dimensions in the Standard Plans.

~~967-3.3.1 Steel Offset Blocks:~~ Blocks must meet the requirements for steel posts.

~~967-3.3.2 Timber Offset Blocks:~~ Blocks must meet the requirements for timber posts.

~~967-3.3.3 Composite Offset Blocks:~~ Composite offset blocks must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit an application in accordance with Section 6 and include the following:

~~1. Test reports from an independent laboratory showing the product meets all crash test requirements of MASH.~~

~~2. Test reports from an independent laboratory showing the composite material meets the following physical requirements:~~

Table 967-1		
Composite Block	Test Method	Requirement
Durometer Hardness	ASTM D2240 Shore D	Minimum 50
Durometer Hardness after UV exposure	ASTM D5870	<15 points change from initial after exposure per ASTM D4329, 1000 hours, cycle C, type UVB-313 lamps

~~967-3.24 Steel Panels and End Pieces:~~ W-beam, thrie-beam, **and** thrie-beam transitions, must meet the requirements of Table 967-1 for steel panels. Terminal connectors, end shoes, end units, and all other compatible components ~~panels~~ must meet the requirements of Table 967-1 for end pieces. AASHTO M180 (for beams and rails), for either Class shown.

~~Galvanize shall have a composition that meets or exceeds "Prime Western Grade" in accordance with ASTM B6.~~ Type II zinc coating ~~is~~**will be** required on all panels.

~~All w-beam, thrie-beam, and thrie-beam transition panels must be marked by a pressed stamp showing production lot information (e.g. AASHTO-approved brand registration, lot number, production date, operator, etc.). Upon approval of the certified mill analysis by the Department, each lot will be stored in the Department's database with a reference to the stamped information.~~

~~967-3.35 Bolts, Nuts, Washers, and Steel Plates:~~ Hex and button head bolts, including nuts, washers, and other accessories, must meet the material requirements of AASHTO M180, except bolts must be galvanized Galvanize hardware in accordance with ASTM A153. Galvanize steel plates in accordance with ASTM A153.

~~967-3.6 Barrier Delineators:~~ Barrier delineators must meet the requirements of Sections 705 and 993 and be listed on the APL.

~~967-3.7 End Delineators:~~ Retroreflective sheeting is to be yellow, Type IV or greater in accordance with Section 994 and listed on the APL.

~~967-3.8 Steel Plates:~~ Steel plates must meet the requirements of ASTM A36. Drill holes prior to galvanizing in accordance with ASTM A123.

**967-3.49 Pipe Rail:** Pipe is to be Schedule 40. ~~in accordance with ASTM A53 and, if~~ applicable, welded prior to galvanizing.

~~967-3.10 Rub Rail: Rail materials must meet the requirements of 967-3.4.~~

**967-3.511 Steel Tube Foundations:** ~~Steel tube foundations must meet the requirements of ASTM A500, Grade B. Galvanize steel tube foundations, brackets, and fixtures a~~After all punching, drilling, stamping, and welding is complete, ~~steel tube foundations are to be galvanized in accordance with ASTM A123 Galvanize in accordance with ASTM A123.~~

~~Brackets and fixtures must meet the requirements of ASTM A36. Foundations must be drilled or punched prior to galvanizing in accordance with ASTM A123.~~

#### **967-4 Barrier Delineators.**

Barrier delineators must meet the requirements of Sections 705 and 993 and be listed on the APL.

#### **967-5 End Delineators.**

Retroreflective sheeting is to be yellow, Type IV or greater in accordance with Section 994 and listed on the APL.

~~967-3.12 Approach Terminal Assemblies: Approach terminals must be listed on the APL.~~

~~Manufacturers seeking evaluation of their product for approval must submit:~~

~~1. A completed application in accordance with Section 6, including product drawings meeting the dimensions of Standard Plans, Index 536-001 and that is signed and sealed by a registered Florida P.E.~~

~~2. Independent test reports indicating that the product meets all crash test requirements of MASH.~~

#### **967-6 Approved Products List.**

967-6.1 Approach Terminal Assemblies: Approach terminals must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit:

1. A completed application in accordance with Section 6, including product drawings meeting the dimensions of Standard Plans, Index 536-001 and that is signed and sealed by a registered Florida P.E.

2. Independent test reports indicating that the product meets all crash test requirements of MASH.

967-6.2 Composite Offset Blocks: Composite offset blocks must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit an application in accordance with Section 6 and include the following:

1. Test reports from an independent laboratory showing the product meets all crash test requirements of MASH.

2. Test reports from an independent laboratory showing the composite material meets the following physical requirements:

<u>Table 967-2</u>		
<u>Composite Block</u>	<u>Test Method</u>	<u>Requirement</u>
<u>Durometer Hardness</u>	<u>ASTM D2240 Shore D</u>	<u>Minimum 50</u>
<u>Durometer Hardness after UV</u>	<u>ASTM D5870</u>	<u>≤ 15 points change from</u>

<u>Table 967-2</u>		
<u>Composite Block</u>	<u>Test Method</u>	<u>Requirement</u>
<u>exposure</u>		<u>initial after exposure per ASTM D4329, 1000 hours, cycle C, type UVB-313 lamps</u>



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 4, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **971**  
Proposed Specification: **9710202 Pavement Marking Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Kenneth Bergum from the State Materials Office to update the AASHTO and ASTM requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us)

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PAVEMENT MARKING MATERIALS  
(REV 10-5-20)**

SUBARTICLE 971-2.2 is deleted and the following substituted:

**971-2.2 Specific Properties:** The large (Type 3 or larger) glass spheres used for drop on beads shall have an adhesion coating. Type 1 glass spheres used for drop on beads shall have a dual coating. Beads used in the intermix of materials are not required to be coated.

The following physical requirements apply:

Table 971-3		
Property	Test Method	Specification
Roundness*	AASHTO <a href="#">PP-R 7498</a>	Min: 70 % by weight
Roundness**	AASHTO <a href="#">PP-R 7498</a>	Min: 80% by weight
Refractive Index*	Becke Line Method (25+/-5C)	1.5 minimum
Refractive Index**	Becke Line Method (25+/-5C)	1.9 minimum

\*Type 1, 3, 4 and 5 beads  
\*\*High Index beads

Table 971-4					
Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO <a href="#">PP-R 7498</a> )				
	Grading Designation				
	Type 1 (AASHTO)	Type 3 (FP 96)	Type 4 (FP 96)	Type 5 (FP 96)	High Index
No. 8				100	
No. 10			100	95 - 100	
No. 12		100	95 - 100	80 - 95	
No. 14		95 - 100	80 - 95	10 - 40	
No. 16	100	80 - 95	10 - 40	0 - 5	100
No. 18		10 - 40	0 - 5	0 - 2	
No. 20	95 - 100	0 - 5	0 - 2		95 - 100
No. 25		0 - 2			
No. 30	75 - 95				55 - 85
No. 40					15 - 45
No. 50	15 - 35				0 - 5
No. 80					
No. 100	0 - 5				

SUBARTICLE 971-3.3 is deleted and the following substituted:

**971-3.3 Physical Requirements:** Test laboratory samples in accordance with ASTM E811 and E1349 and also meet the following criteria:

Table 971-6			
Property	Test Method	Minimum	Maximum
Density	ASTM D1475	13.5 ± 1.4 lb/gal	-
Viscosity at 77°F	ASTM D562	80 KU	100 KU
Fineness of Grind	ASTM D1210	3(HS)	
Dry Opacity at 5 mils WFT	ASTM D2805	0.92	-
Bleed Ratio	ASTM <del>D969</del> D868	0.95	-
Flexibility	ASTM D522 Method B	Pass	-
Abrasion Resistance	ASTM D4060	Pass	-

SUBARTICLE 971-4.3 is deleted and the following substituted:

**971-4.3 Physical Requirements:** Test laboratory samples in accordance with ASTM E811 and E1349. Samples shall meet the following criteria:

Table 971-8			
Property	Test Method	Minimum	Maximum
Density	ASTM D1475	13.5 ± 1.4 lb/gal	N/A
Viscosity at 77°F	ASTM D562	80 KU	100 KU
Fineness of Grind	ASTM D1210	3(HS)	
Dry Opacity at 5 mils WFT	ASTM D2805	0.92	-
Bleed Ratio	ASTM <del>D969</del> D868	0.95	-
Flexibility	ASTM D522 Method B	Pass	-
Abrasion Resistance	ASTM D4060	Pass	-



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 29, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **975**  
Proposed Specification: **9750400 Structural Coating Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the State Construction Office to include painting requirements to aluminum light poles, pedestals, and posts.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STRUCTURAL COATING MATERIALS**  
**(REV 12-8-20)**

ARTICLE 975-4 is deleted and the following substituted:

**975-4 Paint for Galvanized Steel Strain Poles, Mast Arms, and Monotube Assemblies, Conventional Light Pole Assemblies, and Aluminum Poles, Pedestals, and Posts.**

Paint systems ~~used on galvanized steel strain poles, galvanized steel mast arms and galvanized steel monotube assemblies~~ shall meet the color requirements as specified in the Contract Documents. All paint systems shall possess physical properties and handling characteristics that are compatible with the application requirements of Section 649 for galvanized steel and Section 646 and 715 for aluminum. Materials shall be specifically intended for use over galvanized steel or aluminum, as appropriate. Paint systems shall exhibit no loss of adhesion or total color difference ( $\Delta E^*_{ab}$ ) greater than 8.0 units for five years after final acceptance as specified in 5-11. ~~A galvanized steel strain pole, mast arm or monotube assembly that exhibits a~~cumulative surface area of delamination in excess of 100 square inches will constitute an adhesion failure. Delamination shall be defined as any area of exposed metal surface subsequent to hand tool cleaning in accordance with SSPC-SP2. A  $\Delta E^*_{ab}$  value exceeding 8.0 units per the International Commission on Illumination  $L^*a^*b^*$  1976 (CIELAB) space and color difference formula, measured in accordance with ASTM D2244, will constitute a color retention failure.

The Department will measure and enter in the Department's database the CIELAB color chromaticity coordinates for the color of the top coat of sample coupons provided as required by 649-4.3 using a BYK-Gardner Handicolor colorimeter using D65 illuminant and 2-degree geometry settings. The Department-measured CIELAB chromaticity coordinates shall define the initial color and will be used for resolution of color retention failures and the resolution of color retention disputes.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 4, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **985**  
Proposed Specification: **9850401 Geosynthetic Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jason Russell from the State Construction Office to allow natural fibers for erosion control applications to facilitate turf growth.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us)

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GEOSYNTHETIC MATERIALS**  
**(REV 10-5-20)**

SUBARTICLE 985-4.1.2 is deleted and the following substituted:

**985-4.1.2 Erosion Control:** Materials may contain natural fibers added to acceptable plastic erosion mats for the sole purpose of facilitating turf growth. However, materials used for erosion control applications must be tested without any natural fiber components in accordance with and meet the physical requirements in 985-2.2, Table 985-4.

Type	Description
E-1	Staked Silt Fence
E-2	Wind Screen
E-3	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 1)
E-4	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 2)
E-5	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 3)



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **990**  
Proposed Specification: **9900201 Temporary Traffic Control Device Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the State Construction Office to modify the language in support of the changes made to the 102 series of the Standard Plans for the FY21-22 and the FDM.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**TEMPORARY TRAFFIC CONTROL DEVICE MATERIALS  
(REV 11-12-20)**

SUBARTICLE 990-2.1.1 is deleted and the following substituted:

**990-2.1.1 Bands for Temporary Tubular Markers, Vertical Panels, Barricades, ~~Vehicular Longitudinal Channelizing Devices~~, and other Devices:** Bands for temporary tubular markers, vertical panels, barricades, ~~vehicular longitudinal channelizing devices~~, and other devices shall meet the requirements of ASTM D4956 for Type III or higher retroreflective sheeting materials identified in Section 994.

SUBARTICLE 990-13.2 is deleted and the following substituted:

**990-13.2 Product Application:** Manufacturers seeking inclusion of channelizing devices on the APL shall submit the following:

1. For Cones, Drums, and Temporary Tubular Markers:
  - a. Photographs
  - b. Drawings of sufficient detail to distinguish between similar devices
  - c. Manufacturer self-certification of MASH compliant
2. For Barricades and Vertical Panels:
  - a. Installations Instructions
  - b. Photographs
  - c. Drawings (may be included in Installation Instructions) of sufficient detail to distinguish between similar devices
  - d. Any field assembly details and technical information necessary for proper application and installation
  - e. Crash testing reports demonstrating the device meets MASH TL-3
  - f. All relevant FHWA Eligibility Letters



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **990**  
Proposed Specification: **9900303 Temporary Traffic Control Device Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to modify conflicts in the language and clarify legibility requirements. Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## TEMPORARY TRAFFIC CONTROL DEVICE MATERIALS (REV 11-12-20)

ARTICLE 990-3.3 is deleted and the following substituted:

### 990-3.3 Portable Changeable Message Sign:

#### 990-3.3.1 Message Matrix:

1. Message matrix panel shall be a maximum height of 7 feet by a maximum width of ~~10 feet~~ 146 inches.
2. The matrix must be capable of displaying three lines of 8 characters using an 18 inch or 12 inch font ~~that meets the height to width ratio and character spacing requirements in the MUTCD, Section 2L.04, paragraphs 05, 06, and 08~~. PCMS with a minimum font size of 18 inches shall be used on any speed facility. PCMS with a minimum font size of 12 inches may be used on facilities with speed limits of 45 mph or less.
3. The matrix must display characters that meet or exceed the numeral and letter sizes prescribed in the MUTCD and SHS (Standard Highway Signs) companion document. Fonts and graphics must mimic the characteristics of fonts and graphics defined in NEMA TS4, the MUTCD, and SHS.
4. Similar components shall be interchangeable.

#### 990-3.3.2 Operation and Performance:

1. The message shall be displayed in upper case except when lower case is project specific and is allowed by the MUTCD.
2. The message matrix panel shall be visible from one-half mile ~~and legible from a distance of 650 feet under both day and night conditions~~.
3. The 18 inch letter height message shall be legible from 650 feet for nighttime conditions and 800 feet for normal daylight conditions.
4. The 12 inch letter height message shall be legible from 650 feet for nighttime conditions and 650 feet for normal daylight conditions.
5. Under variable light level conditions the sign shall automatically adjust its light source to ~~meet the 650 feet visibility requirement~~ maintain legibility.
6. The message panel shall have adjustable display rates, so that the entire message can be read at least twice at the posted speed.
7. The control panel shall have the capability to store a minimum 50 pre-programmed messages.
8. The controller in the control panel shall be able to remember messages during non-powered conditions.
9. The controller shall allow the operator to generate additional messages on site via the keyboard.
10. All messages shall be flashed or sequenced. In the sequence mode, the controller shall have the capability to sequence three line messages during one cycle.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **991**  
Proposed Specification: **9910000 CHANNELIZING DEVICE MATERIALS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Gevin McDaniel from the Roadway Design Office to add appropriate materials requirements for channelizing devices to the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CHANNELIZING DEVICE MATERIALS**  
**(REV ~~10-512-14-20~~)**

The following new Section is added after Section 990.

**SECTION 991**  
**CHANNELIZING DEVICE MATERIALS**

**991-1 Durable Tubular Markers**

**991-1.1 General.**

This subarticle describes the material requirements for tubular markers installed in accordance with Section 704. All Durable Tubular Marker products shall be listed on the Department's Approved Products List (APL).

**991-1.2 Dimensions.**

The post shall have a minimum diameter of 3 inches. The base of the tubular marker shall have a maximum dimension in any direction of 8 inches. The height of the tubular marker above the pavement surface shall be 36 -inches.

**991-1.3 Color.**

Tubular Marker color must be uniform and integral throughout entire height of the post. The base may be black in color.

**991-1.3.1 White.**

The yellowness index shall not exceed -12, tested in accordance with ASTM -E313. -The daytime 45 degrees, 0 degrees luminance factor, Cap- Y, shall be a minimum of- 70, tested in accordance with ASTM- E1347 or ASTM- E1164.

**991-1.3.2 Yellow.**

The daytime 45 degrees, 0 degrees luminance factor, Cap- Y, shall be a minimum of 60, tested in accordance with ASTM- E1347 or ASTM- E1164.

**991-1.4 Retroreflective Sheeting.**

The color of the retroreflective sheeting shall match the color of the tubular marker. The retroreflective sheeting shall be abrasion resistant Type- IV or Type- V and meet the requirements of Section- 994. The retroreflective sheeting shall meet supplementary requirements for reboundable sheeting as stated in section S.2- of ASTM -D4956. The sheeting shall wrap around the entire circumference of the tube and have a minimum vertical dimension of ~~6~~-10 inches. The top of sheeting shall be 1-1/2- inches plus or minus 1/2 inch below the top of post.

**991-1.5 Product Testing.**

Manufacturers seeking evaluation of Durable Tubular Markers must include test reports from the National Transportation Product Evaluation Program (NTPEP) documenting the product meets the requirements of this Section. NTPEP impact testing must be performed on each substrate (concrete and open-graded friction course asphalt) in accordance with NTPEP Evaluation of Temporary Traffic Control Devices: Flexible Delineators for the category of High Speed Applications and for hot weather test temperature only.

Impact tests shall be performed only on tubular markers measuring 36 -inches above the pavement surface.

Products listed on the IPL for Managed Lane Markers prior to July 2021 will be acceptable on projects until June 30, 2022 to allow a grace period to complete the required testing.



Acceptable products are those listed on the IPL for Managed Lane Markers prior to July 2021 or those meeting the following requirements after receiving an average of 75- bumper impacts per sample and an average of 175- tire impacts per sample:

1. All posts shall self-restore to within 15- degrees list or lean from vertical.

2. All posts shall have a minimum of 50%- of its cross-section, at any point along the post height, free of tears or cracks.

**991-1.6 Approved Product List Submission Requirements.**

Manufacturers seeking evaluation of Durable Tubular Marker products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation.

<b><u>Documentation</u></b>	<b><u>Requirement</u></b>
<u>Product Photo</u>	<u>Displays the significant features of the product.</u>
<u>Technical Data Sheet, marker and adhesive</u>	<u>Uniquely identifies the product and includes product specifications, storage instructions, and recommended installation materials and equipment as applicable.</u>
<u>Safety Data Sheet, Adhesive</u>	<u>SDS meeting OSHA requirements for product and manufacturer recommended installation materials as applicable.</u>
<u>National Testing Product Evaluation Program (NTPEP) product testing report</u>	<u>See Section -991-1.5</u>
<u>Installation Instructions</u>	<u>Include mounting surface preparations, and touch-up and repair procedures. Separate installation instructions are required for different substrates.</u>
<u>Product Sample</u>	<u>Upon request from the Department, submit a sample of the tubular marker mounting material or hardware. If the product is a system comprised of multiple parts, a sample of each part must be submitted.</u>

**991-2 Standard Tubular Markers:**

**991-2.1 General.**

This subarticle describes the material requirements for tubular markers installed in accordance with Section- 704. All Standard Tubular Marker products shall be listed on the Department's Approved Products List (APL). Standard Tubular Markers must be approved for project-specific use with an issued project-specific pay item.

**991-2.2 Dimensions.**

The post shall have a minimum diameter of 2- inches. The minimum height of the tubular marker above the pavement surface shall be 36- inches.

**991-2.3 Color.**

Tubular Marker color must be uniform and integral throughout entire height of the post. The base may be black in color.

**991-2.3.1 White.**

The yellowness index shall not exceed- 12, tested in accordance with ASTM- E313. The daytime 45 degrees, 0 degrees luminance factor, Cap- Y, shall be a minimum of- 70, tested in accordance with ASTM- E1347 or ASTM- E1164.

#### **991-2.3.2 Yellow.**

The daytime 45 degrees, 0 degrees luminance factor, Cap- Y, shall be a minimum of- 60, tested in accordance with ASTM- E1347 or ASTM- E1164.

#### **991-2.4 Retroreflective Sheeting.**

The color of the retroreflective sheeting shall match the color of the tubular marker. The retroreflective sheeting shall be abrasion resistant Type- IV or Type- V and meet the requirements of Section- 994. The retroreflective sheeting shall meet supplementary requirements for reboundable sheeting as stated in section S.2- of ASTM- D4956. The sheeting shall wrap around the entire circumference of the tube and have a minimum vertical dimension of 615 inches. The top of sheeting shall be 1-1/2- inches plus or minus 1/2 inch below the top of post.

#### **991-2.5 Product Testing.**

Manufacturers seeking evaluation of Standard Tubular Markers must include test reports from the National Transportation Product Evaluation Program (NTPEP) documenting the product meets the requirements of this Section. NTPEP impact testing must be performed on each substrate (concrete and open-graded friction course asphalt) in accordance with NTPEP Evaluation of Temporary Traffic Control Devices: Flexible Delineators for the category of High Speed Applications and for hot weather test temperature only.

Impact tests shall be performed only on tubular markers measuring 36- inches above the pavement surface.

Acceptable products are those meeting the following requirements after receiving an average of 50- bumper impacts per sample and an average of 50- tire impacts per sample:

1. Six out of eight posts shall self-restore to within 15- degrees list or lean from vertical.

2. All posts shall have a minimum of 50%- of its cross-section, at any point along the post height, free of tears or cracks.

#### **991-2.6 Approved Product List Submission Requirements.**

Manufacturers seeking evaluation of Standard Tubular Marker products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation.

**Table 991-2**

<b><u>Documentation</u></b>	<b><u>Requirement</u></b>
<u>Product Photo</u>	<u>Displays the significant features of the product.</u>
<u>Technical Data Sheet, marker and adhesive</u>	<u>Uniquely identifies the product and includes product specifications, storage instructions, and recommended installation materials and equipment as applicable.</u>
<u>Safety Data Sheet, Adhesive</u>	<u>SDS meeting OSHA requirements for product and manufacturer recommended installation materials as applicable.</u>
<u>National Testing Product Evaluation Program (NTPEP) product testing report</u>	<u>See Section 991-2.5</u>
<u>Installation Instructions</u>	<u>Include mounting surface preparations, and touch-up and repair procedures. Separate installation instructions are required for different substrates.</u>
<u>Product Sample</u>	<u>Upon request from the Department, submit a sample of the tubular marker mounting material or hardware. If the product is a system comprised of multiple parts, a sample of each part must be submitted.</u>



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 14, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **992**  
Proposed Specification: **9920109 Highway Lighting Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Richard Stepp from the State Roadway Design Office to update table 992-1 to the Roadway Standard.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HIGHWAY LIGHTING MATERIALS****(REV 12-14-20)**

SUBARTICLE 992-2.4.1 is deleted and the following substituted:

**992-2.4 Luminaires:** Provide luminaires in accordance with the following requirements.

**992-2.4.1 Luminaires for Conventional Lighting:** Luminaires shall meet the following additional requirements:

a. A maximum correlated color temperature (CCT) of 4000°K meeting ANSI C78.377A (3985°K, plus or minus 275°K).

b. The optical portion of the housing shall be sealed to provide an IP 66 rating.

The luminaire mounting assembly shall be a slipfitter type designed to accommodate a nominal 2 inch pipe size (2-3/8 inch O.D.) arm or a pole top mounting assembly designed to accommodate a 2-3/8 inch pole top tenon.

For APL qualification, the manufacturer must have a fixture with an IESNA light distribution curve (IES LM-79) by an EPA recognized laboratory, meeting a minimum pole spacing of 240 feet using the AGi32 lighting optimization tool with the following settings:

Setting	Requirement
Roadway Standard	IES RP-8- <del>2000</del> 18
R-Table	R3 (Q0=0.07)
Roadway Layout	Two Rows Opposite, With Median, 2R OPP w/M
Roadway Width	40 feet
Median Width	22 feet
Number of Lanes in Direction of Travel	3
Driver's Side of Roadway	Right
Calculation Area	Bottom
Mounting Height	As per manufacturer's recommendation
Setback	12 feet
Tilt	0°
Optimization Criteria	Avg. Illuminance = 1.5 fc Avg./Min. Ratio = 4 Max./Min. Ratio = 10 Lv Max./L Avg. Ratio = 0.3
Arm Length	Pole top fixtures – as provided by the IES file Arm mounted fixtures – 12 feet



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **993**  
Proposed Specification: **9930100 OBJECT MARKERS AND DELINEATORS.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Gevin McDaniel to remove High Performance Delineators and High Visibility Median Separator Delineators from the Specification and add new language to the Standard Specification. Please note there are two other revisions, the 9910000 and 7040000 that complement this proposal. They will be in separate emails for documentation purposes. See [Roadway Design Memorandum 20-03](#) for a detailed description of these changes.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**OBJECT MARKERS AND DELINEATORS**(REV ~~10-812-8-20~~)

ARTICLE 993-1 is deleted and the following substituted:

**SECTION 993  
OBJECT MARKERS AND DELINEATORS****993-1 Object Markers.**

**993-1.1 General:** Object markers shall meet the general requirements outlined in the Manual of Uniform Traffic Control Devices (MUTCD). For uniformity, all Type 1 markers shall be ~~either OM1-1 or OM1-3 style markers, all Type 2 markers shall be either OM2-1V or OM2-2V style markers, and all Type 4 (end of road) markers shall be OM4-3 style markers, and all end of road markers shall be either OM4-1 or OM4-3 style markers.~~

~~**993-1.2 Retroreflectors:** The reflectors shall be of acrylic plastic and shall be a minimum of 3 inches in diameter. They shall be mounted in a heavy-duty housing with a back plate.~~

~~The reflector shall consist of a clear and transparent plastic lens, which shall be red or amber as specified, and a plastic back of the same material, fused to the lens under heat and pressure around the entire perimeter, in such manner as to form a homogeneous unit, permanently sealed against dust, water, and water vapor.~~

~~The lens shall consist of a smooth front surface, free from projections or indentations (other than for identification or orientation) and a rear surface bearing a prismatic configuration such that it will effect total internal reflection of light.~~

~~The acrylic plastic shall be of a type meeting the requirements of Federal Specification L-P-380, Type I, Class 3, and, in order that the Department can readily check the suitability of the raw material used, the manufacturer shall stipulate the raw material and the particular molding compound to be furnished.~~

~~**993-1.2.1 Durability Tests for Retroreflectors:** Seal Test: The following test will be used to determine if a reflector is adequately sealed against dust and water.~~

~~Submerge 20 samples in water bath at room temperature. Subject the submerged samples to a vacuum of 10 inches gauge for five minutes. Restore atmospheric pressure and leave samples submerged for five minutes, then remove and examine the samples for water intake. Failure of more than two of the 20 samples tested shall be cause for tentative rejection of the LOT.~~

~~**993-1.2.2 Optical Requirements:** The initial specific intensity of object markers shall be at least equal to the minimum values shown below. Failure to meet the required specific intensity shall constitute failure of the reflector being tested.~~

Observation Angle	Entrance Angle	Specific Intensity candelas/foot-candle		
		Crystal	Yellow	Red
0.1 degree	0 degree	40	24	10
0.1 degree	20 degree	16	10	4

The reflector to be tested shall be spun so as to have an average orientation effect, and shall be placed at a distance of 100 feet from a single light source having an effective diameter of 2 inches. The light source shall be operated at approximately normal efficiency. The return light from the reflector shall be measured by means of a photo-electric photometer having a minimum sensitivity of 1 by  $10^7$  foot-candles per mm scale division. The photometer shall have a receiving aperture of 1/2 inch diameter, shielded to prevent the entry of stray light. The distance from light source center to aperture center shall be 2.1 inches for the 0.1 degree observation angle.

If a test distance other than the stipulated 100 feet is used, the source and the aperture dimensions, and the distance between source and aperture shall be modified directly as the test distance.

**993-1.2.3 Reflector Housing:** The reflector shall be mounted in a housing fabricated of aluminum alloy No. 3003-H 14 (or other alloy approved as equal for the purpose), and having a thickness of 0.064 inches.

**993-1.3 Retroreflective Sheeting:**

**993-1.3.1 Retroreflective Sheeting:** The retroreflective sheeting for object markers shall meet the requirements of Section 994, sheeting Types IV, V or XI. The retroreflective area shall be in accordance with the MUTCD. The retroreflective sheeting shall be permanently adhered to 0.040 inch sheet aluminum for Type 2 markers and 0.080 inch sheet aluminum for Type 1, 3 and end-of-the-road markers. Aluminum shall be of 6061-T6 (ASTM B209) prepared in accordance with recommendations of the sheeting manufacturer.

**993-1.3.2 Assembly:** Type 2 and 3 markers shall be mounted directly to the post by two holes on the face of the marker. The mounting holes shall be 1/4 inch square holes to receive 1/4 inch carriage bolts, or other 1/4 inch bolts and shall be spaced to fit holes on the post spaced at 1 inch centers.

**993-1.4 Posts:** The marker posts shall be of steel or aluminum as shown in the Standard Plans or the Plans. Steel posts shall be 3 lb/ft. flanged U-Channel. The U-channel posts shall meet the mechanical requirements of ASTM A499, Grade 60. Provide U-channel posts that have been galvanized after fabrication in accordance with ASTM A123 and have a smooth uniform finish free from defects affecting strength, durability and appearance. For each U-channel, punch or drill 3/8 inch diameter holes on 1 inch centers through the center of the post, starting approximately 1 inch from the top and extending the full length of the post. Punching or drilling operations shall be completed prior to galvanization. The weight per foot of a manufacturer's U-channel size shall not vary more than plus or minus 3.5% of its specified weight per foot. Machine straighten the U-channel to a tolerance of 0.4% of the length. U-channel posts shall be listed on the APL. Round aluminum posts shall meet the requirements of Standard Plans, Index 700-010.

Use attachment hardware (nuts, bolts, clamps, brackets, braces, etc.) of aluminum or galvanized steel.

**993-1.2.3 Retroreflective Sheeting:**

**993-1.2.3.1 Retroreflective Sheeting:** The retroreflective sheeting for object markers shall meet the requirements of Section 994, sheeting Types IV, V or XI. The retroreflective area shall be in accordance with the MUTCD. The retroreflective sheeting shall be permanently adhered to ~~0.040 inch~~ 0.040-inch sheet aluminum for Type 2 markers and 0.080-inch sheet aluminum for Type 1, Type 3, and Type 4 end-of-the-road markers. Aluminum



shall be of 6061-T6 (ASTM B209) prepared in accordance with recommendations of the sheeting manufacturer.

**993-1.23.2 Assembly:** Type 2 and 3 markers shall be mounted directly to the post by two holes on the face of the marker. The mounting holes shall be 1/4-inch square holes to receive 1/4-inch carriage bolts, or other 1/4-inch bolts and shall be spaced to fit holes on the post spaced at 1-inch centers.

**993-1.34 Posts:** The marker posts shall be of steel or aluminum as shown in the Standard Plans or the Plans. Steel posts shall be 3 lb/ft. flanged U-Channel. The U-channel posts shall meet the mechanical requirements of ASTM A499, Grade 60. Provide U-channel posts that have been galvanized after fabrication in accordance with ASTM A123 and have a smooth uniform finish free from defects affecting strength, durability, and appearance. For each U-channel, punch or drill 3/8-inch diameter holes on 1-inch centers through the center of the post, starting approximately 1 inch from the top and extending the full length of the post. Punching or drilling operations shall be completed prior to galvanization. The weight per foot of a manufacturer's U-channel size shall not vary more than plus or minus 3.5% of its specified weight per foot. Machine-straighten the U-channel to a tolerance of 0.4% of the length. U-channel posts shall be listed on the APL. Round aluminum posts shall meet the requirements of Standard Plans, Index 700-010.

Use attachment hardware (nuts, bolts, clamps, brackets, braces, etc.) of aluminum or galvanized steel.

ARTICLE 993-2 is deleted and the following substituted:

## 993-2 Delineators.

**993-2.1 General:** Delineators shall be classified into ~~five~~ the following types: flexible post delineators, nonflexible post delineators, ~~high visibility median separator delineators, high performance delineators,~~ and barrier delineators.

### 993-2.2 Flexible Post Delineators:

**993-2.2.1 Dimensions:** The post shall have a minimum width of 3 inches facing traffic and of such length to generally provide a height of 48 inches above the pavement surface.

**993-2.2.2 Color:** The post shall be opaque white. The yellowness index shall not exceed 12 when tested in accordance with ASTM E313. The ~~daytime~~ light 45 degrees, 0 degrees ~~luminanceous factor, Cap Y, directional reflectance~~ shall be a minimum of ~~70,~~ when tested in accordance with ASTM E1347 or ASTM E1164.

**993- 2.2.3 Retroreflective Sheeting:** The reflective sheeting shall be Types IV, V, ~~or~~ XI and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 3 inches and have a minimum area of 30 square inches.

**993-2.2.4 Impact Performance:** Six of the eight posts shall be capable of returning to a vertical position plus or minus 10 degrees with no delaminating. No post shall split, crack, break, or separate from base. Posts shall be tested and evaluated according to the National Testing Product Evaluation Program (NTPEP) ~~Project Work Plan for Field Evaluation of Flexible Surface Mounted Delineator Posts~~ Evaluation of Temporary Traffic Control Devices: Flexible Delineators, for the following categories:

993-2.2.4.1 Pavement/Surface mounted: Use the Metropolitan Delineator Applications category for Hot Weather with a minimum of 10 impacts (default testing procedure uses a maximum of 200 impacts).

**993-2.2.4.2 Ground mounted:** Use the Ground Mount Side of Roadway Applications category for Hot Weather (default testing procedure uses a maximum of 10 impacts). A temperature of 65°F or greater may be used in lieu of the NTPEP temperature requirements. Posts shall be capable of returning to a vertical position plus or minus 5 degrees with no delaminating, and one post may list no more than 10 degrees. No post shall split, crack, break, or separate from base.

**993-2.3 Nonflexible Post Delineators:**

**993-2.3.1 Posts:** The posts shall meet the requirements of 993-1.4, except the steel delineator post shall be 1.1 lb/ft.

**993-2.3.2 Retroreflective Sheeting:** The retroreflective sheeting shall be Types IV, V, or XI sheeting and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 4 inches and have a minimum area of 32 square inches. The retroreflective sheeting shall be permanently adhered to 0.040-inch sheet aluminum.

**993-2.4 High Visibility Median Separator Delineators:**

**993-2.4.1 Dimensions:** The delineator shall have a minimum height of 42 inches above the surface of the separator.

**993-2.4.2 Post Base:** The base shall be manufactured to accommodate the replacement of the post. The base shall be mechanically anchored to the separator and be capable of withstanding ten vehicle impacts without damage.

**993-2.4.3 Color:** The plastic post shall be opaque white. The yellowness index shall not exceed 12 when tested in accordance with ASTM E313. The daylight 45 degree, 0 degree luminous directional reflectance shall be a minimum of 70 when tested in accordance with ASTM E1347 or ASTM E1164.

**993-2.4.4 Retroreflective Sheeting:** The reflective sheeting shall be Types IV, V, or XI and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 8 inches and have a minimum area of 230 square inches facing the approach to the separator. The sheeting shall be yellow in color for both approaches.

**993-2.4.5 Impact Performance:** The post, installed according to manufacturer's recommendations, shall be capable of returning to a vertical position plus or minus 5 degrees when tested according to National Testing Product Evaluation Program (NTPEP). The NTPEP requirement of one half of the hits at 32 F is waived. All hits may be at 65 F or greater. NTPEP data or independent test lab data shall be submitted for product approval.

**993-2.5 High Performance Delineators:**

**993-2.5.1 Dimensions:** The delineator shall have a minimum height of 36 inches above the pavement surface and have a minimum diameter of 2 inches.

**993-2.5.2 Post Base:** The base shall be mechanically anchored to the pavement and be capable of withstanding 50 vehicle impacts without damage.

**993-2.5.3 Color:** The plastic post shall be opaque white. The yellowness index shall not exceed 12 when tested in accordance with ASTM E313. The daylight 45 degree, 0 degree luminous directional reflectance shall be a minimum of 70 when tested in accordance with ASTM E1347 or ASTM E1164.

**993-2.5.4 Retroreflective Sheeting:** The reflective sheeting shall be Type V abrasion resistant sheeting and meet the requirements of Section 994. The reflective sheeting shall have a minimum omni directional area of 30 square inches.

**993-2.5.5 Impact Performance:** To resist an impact of a test vehicle, the post must restore to within 10 degrees of vertical in any direction, and not have a crack or tear

~~through more than 50% of its cross section. List/Lean must be measured from the point the post protrudes from the base to the top edge of the post. For acceptance purposes, there should be no post failures and no more than two posts may list between 5 degrees and 10 degrees after receiving fifty vehicle impacts.~~

~~Impact testing must be performed in accordance with NTPEP Evaluation of Temporary Traffic Control Devices: Flexible Delineators, for the category of High Speed Applications. Testing must be performed by a facility that is listed on the Laboratories Accredited to Crash Test Roadside Safety Hardware which can be found at the following URL: [http://tf13.org/Subcommittee\\_7\\_Test\\_Facilities.php](http://tf13.org/Subcommittee_7_Test_Facilities.php).~~

**993-2.64 Barrier Delineators:**

**993-2.64.1 General:** Barrier delineators shall consist of retroreflective sheeting permanently adhered to 0.090-inch minimum thick body. The body shall have a flexible hinge which allows the reflector to fold down and spring back to an upright position after impact. Barrier delineators for guardrail shall be designed for mounting to the web of steel posts or designed for mounting to the top of wood posts. Barrier delineators for concrete barrier, traffic railings, and vehicular longitudinal channelizing devices (LCDs) shall be designed for mounting to the top of each device.

**993-2.64.2 Retroreflective Sheeting:** The sheeting for barrier delineators shall be Type IV or XI meeting the requirements of Section 994. The sheeting shall be yellow or white, depending on the locations of use for each. The dimensions of the retroreflective sheeting shall be a minimum of 3 inches wide by 4 inches high. The sheeting shall be installed by the delineator manufacturer.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **994**  
Proposed Specification: **9940200 Retroreflective and Nonreflective Sheeting and Sign Panel Fabrication.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Awilda Merced-Fernandez from the State Materials Office to include digital printing technology as an option to fabricate signs. To reinstate the use of Fluorescent Yellow-Green and Fluorescent Yellow Type XI sheeting. To eliminate non applicable requirements and other minor editorial changes.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**RETROREFLECTIVE AND NONREFLECTIVE  
SHEETING AND SIGN PANEL FABRICATION  
(REV 12-4-20)**

SUBARTICLE 994-2.1 is deleted and the following substituted:

**994-2 Retroreflective and Nonreflective Sheeting Systems.**

**994-2.1 Materials:** Retroreflective sheeting material shall be classified in accordance with and meet the requirements of ASTM D4956. Overlay materials include colored and colorless transparent overlays and vinyl. Inks include transparent and opaque silkscreen inks as well as inkjet inks used in digital print systems.

SUBARTICLE 994-2.2 is deleted and the following substituted:

**994-2.2 Approved Product List (APL):** All sheeting, process inks and overlay materials shall be listed as a system on the Department's Approved Product List (APL). Sign sheeting systems shall consist of base sheeting with ink and/or overlay materials. Products with an ASTM classification of Type XI or greater will not be accepted for qualification on the APL for fluorescent orange, ~~fluorescent yellow and fluorescent yellow-green~~. Manufacturers seeking evaluation of their products need to submit product data sheets, performance test reports from an independent laboratory showing the sign sheeting system meets the requirements of this Section, and a APL application in accordance with Section 6. Information on the APL application shall include the individual materials comprising the sign sheeting system and identify colors, ASTM base sheeting classification, adhesive backing class, availability of transparent and/or opaque backing and availability of liner types. ~~Submit an infrared identification curve (2.5 to 15 μm) for each color of ink.~~

SUBARTICLE 994-2.3.3 is deleted and the following substituted:

**994-2.3.3 Clear Overlay Films:** Clear overlay film shall be compatible with the sign sheeting system and not delaminate or discolor for the in-service life of the system. ~~Submit spectrophotometer analysis indicating the luminous transmittance across the wavelength range from 325 nm to 700 nm in accordance with ASTM D1003 Procedure B. Film shall filter less than 1.0% luminous transmittance for 325 nm to 350 nm.~~

SUBARTICLE 994-2.3.4 is deleted and the following substituted:

**994-2.3.4 Outdoor Weathering:** Outdoor weathering exposure of sign sheeting systems shall be performed in accordance with ASTM D4956, and meet the requirements ~~of ASTM D4956~~ for each system, color, and classification. All testing shall be conducted at an exposure location meeting the Tropical Summer Rain Climate Type (Miami, Florida or equivalent). Outdoor weathering is not required for Type VI fluorescent pink.

SUBARTICLE 994-3.5.2 is deleted and the following substituted:

**994-3.5.2 Application of Sheeting:** Apply retroreflective sheeting to the base panels with mechanical equipment in a manner specified for the manufacture of traffic control signs by the sheeting manufacturer. For sheeting that has been identified as rotationally sensitive, apply white sheeting for cut-out legends, symbols, borders and route marker attachments within the parent sign face at the optimum rotation angle according to the identification markings. Apply all background sheeting at a uniform rotational angle. The retroreflective sheeting for each sign will be from the same roll or lot number. Apply consecutively alternate successive width sections of either sheeting or panels to ensure that corresponding edges of sheeting lie adjacent on the finished sign. If the sign cannot be constructed from retroreflective sheeting from the same roll or lot number, the fabricator may color match from a different lot; the color between the rolls cannot exceed three  $\Delta E$ 's using test method ASTM D 2244. The Engineer shall not accept nonconformance that may result in non-uniform shading and an undesirable contrast between adjacent widths of applied sheeting or non-optimum retroreflectivity in the finished sign and installation.

Sheeting is to be trimmed at 45-degree angle from the edge of each panel. Finish signs by sealing sheeting splices and sign edges according to sign manufacturer recommendations.

ARTICLE 994-3 is expanded by the following:

**994-3.5.4 Digital Printing Process:** Digital print systems shall include a digital printer, with appropriate software and drivers, flexible white or colored prismatic retroreflective sheeting in accordance with the recommendation of the sheeting manufacturer. The use of a certified digital sign fabricator will be required. Digital sign fabricators shall be certified by the reflective sheeting manufacturer or a third-party certifier approved by the reflective sheeting manufacturer. Inks or ribbons shall be of a type and quality formulated to produce colors that meet the chromaticity requirements given in ASTM D4956 for retroreflective sheeting material when printed and finished as recommended by the sheeting manufacturer.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

February 3, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **996**  
Proposed Specification: **9960400 Intelligent Transportation System Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to move the material articles and subarticle in Section 620, 635, and 641 from Division II to Division III.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**INTELLIGENT TRANSPORTATION SYSTEM DEVICE MATERIALS  
(REV 11-4-20)**

SECTION 996 is expanded by the following new Articles:

**996-4 Grounding and Lightning Protection.**

**996-4.1 General:** Surge Protective Devices for traffic control devices, including intelligent transportation system (ITS), shall be listed on the Department’s Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

**996-4.2 Surge Protective Device.**

**996-4.2.1 Description:** Surge Protective Devices (SPDs) protect electronics from lightning, transient voltage surges, and induced current.

**996-4.2.2 SPD for 120 Volt or 120/240 Volt Power:** The SPD shall include L-N, L-G, and N-G protection and have a maximum surge current rating of 50 kA per phase or greater. The SPD shall meet the requirements of UL 1449, Third Edition and be listed by a NRTL.

The SPD shall have a visual indication system that monitors the weakest link in each mode and shows normal operation or failure status and also provides one set of normally open (NO)/normally closed (NC) Form C contacts for remote alarm monitoring. The enclosure for a SPD shall have a NEMA 4 rating.

**996-4.2.3 SPD at Point of Use:** The SPD shall comply with the minimum functional requirements shown in Table 996-3. The units shall be rated at 15 or 20 amps load and are configured with receptacles.

The units shall have internal fuse protection and provide common mode (L+N-G) protection.

**996-4.2.4 SPD for Low-Voltage Power, Control, Data and Signal Systems:** The SPD devices shall comply with the minimum functional requirements shown in Table 996-3 for all available modes (i.e. power L-N, N-G; L-G, data and signal center pin-to-shield, L-L, L-G, and shield-G where appropriate).

<u>Table 996-3</u>				
<u>SPD Minimum Requirements</u>				
<u>Circuit Description</u>	<u>Clamping Voltage</u>	<u>Data Rate</u>	<u>Surge Capacity</u>	<u>Maximum Let-Through Voltage</u>
<u>12 V<sub>DC</sub></u>	<u>15-20 volts</u>	<u>N/A</u>	<u>5kA per mode (8x20 μs)</u>	<u>&lt;150 V<sub>pk</sub></u>
<u>24 V<sub>AC</sub></u>	<u>30-55 volts</u>	<u>N/A</u>	<u>5kA per mode (8x20 μs)</u>	<u>&lt;175 V<sub>pk</sub></u>
<u>48 V<sub>DC</sub></u>	<u>60-85 volts</u>	<u>N/A</u>	<u>5kA per mode (8x20 μs)</u>	<u>&lt;200 V<sub>pk</sub></u>



<u>Table 996-3</u>				
<u>SPD Minimum Requirements</u>				
<u>Circuit Description</u>	<u>Clamping Voltage</u>	<u>Data Rate</u>	<u>Surge Capacity</u>	<u>Maximum Let-Through Voltage</u>
<u>120 V<sub>AC</sub> at POU</u>	<u>150-200 volts</u>	<u>N/A</u>	<u>20kA per mode (8x20 μs)</u>	<u>&lt;550 Vpk</u>
<u>Coaxial Composite Video</u>	<u>4-8 volts</u>	<u>N/A</u>	<u>10kA per mode (8x20 μs)</u>	<u>&lt;65 Vpk (8x20 μs/1.2x50μs; 6kV, 3kA)</u>
<u>RS422/RS485</u>	<u>8-15 volts</u>	<u>Up to 10 Mbps</u>	<u>10kA per mode (8x20 μs)</u>	<u>&lt;30 Vpk</u>
<u>T1</u>	<u>13-30 volts</u>	<u>Up to 10 Mbps</u>	<u>10kA per mode (8x20 μs)</u>	<u>&lt;30 Vpk</u>
<u>Ethernet Data</u>	<u>7-12 volts</u>	<u>Up to 1 Gbps</u>	<u>1kA per mode (10x1000 μs)</u>	<u>&lt;30 Vpk</u>
<u>POE</u>	<u>60-70 volts</u>	<u>Up to 1 Gbps</u>	<u>5kA per mode (8x20 μs)</u>	<u>&lt;200Vpk (100kHz 0.5μs; 6kV, 500A)</u>

The SPDs shall meet the requirements of UL 497B or UL 497C, as applicable, and are listed by a NRTL.

**996-4.2.5 Mechanical Specifications:** The equipment shall be permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number.

All parts shall be made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal.

**996-4.2.6 Environmental Specifications:** The SPDs shall operate properly during and after being subjected to the temperature and humidity test described in NEMA TS 2, Section 2.2.7, and the vibration and shock tests described in NEMA TS 2, Sections 2.2.8 and 2.2.9.

**996-5 Pull and Splice Boxes.**

**996-5.1 General:** Pull and splice boxes shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

Manufacturers of concrete pull and splice boxes and covers seeking inclusion on the APL shall meet the requirements of Section 105 and this Section and be listed on the Department's Production Facility Listing.

The box bodies and covers shall be free of flaws such as cracks, sharp, broken, or uneven edges, and voids.

Ensure in-ground boxes have an open bottom design.

**996-5.2 Marking:** The following information shall be permanently cast or engraved into the top surface of all pull and splice box covers. If used, identification plates shall be UV stable, mechanically fastened, and bonded with adhesive material suitable for outdoor applications

1. Mark application as follows:

FDOT TRAFFIC SIGNAL for signalized intersections

FDOT FIBER OPTIC CABLE for fiber optic cable

FDOT LIGHTING for highway lighting

FDOT TRAFFIC MONITORING for traffic monitoring

FDOT ELECTRICAL for other electrical applications

2. Manufacturer's name or logo

3. FDOT APL approval number

4. TIER rating

The date of manufacture (month/day/year, or date code) shall be permanently located on the top or bottom of the cover. The interior of the box body shall have a permanent marking that includes the manufacturer part/model number and date of manufacture near the top of box in a location that is visible after installation when the cover is removed.

### **996-5.3 Dimensions:**

For signalized intersection and lighting applications, pull boxes with nominal cover dimensions of 13 inches wide by 24 inches long or larger and no less than 12 inches deep shall be provided. The inside opening area shall be a minimum of 240 square inches and no inside dimension shall be less than 12 inches.

For fiber optic cable applications, pull boxes with nominal cover dimensions of 24 inches wide by 36 inches long or larger and no less than 24 inches deep shall be provided.

Rectangular splice boxes with nominal cover dimensions of 30 inches wide by 60 inches long or larger and no less than 36 inches deep shall be provided. Round splice boxes with a nominal cover diameter of 36 inches or larger and no less than 36 inches deep shall be provided.

**996-5.4 Fabrication:** Box covers shall be constructed of concrete, polymer concrete or other materials meeting the requirements of this Section.

Box covers with lifting slots and a flush-seating lockdown mechanism shall be provided. Penta-head or other non-standard, security type lockdown lag bolts shall be used. Lockdown bolts and lifting slots shall be Type 316, 304, or 302 passivated stainless steel or brass. Lockdown bolt assembly shall be designed to prevent seizing and can be removed without damaging the cover or box body. The lockdown bolt threaded insert/nut assembly shall be field replaceable.

**996-5.5 Testing Requirements:** Pull and splice boxes shall meet the American National Standards Institute/Society of Cable Telecommunications Engineers (ANSI/SCTE) 77 2017 Specification for Underground Enclosure Integrity for TIER 15 loading with the following additional clarifications and requirements:

1. Apply all environmental tests to the box and its cover.

2. All flexural testing shall be conducted in accordance with an appropriate ASTM standard and clearly stated in the report.

3. Perform repetitions of Cycle 1 in Table X2.1 of ASTM G154 for a minimum duration of 1000 hours for the simulated sunlight exposure test.

4. Use deflection-measuring devices positioned to measure vertical and lateral deflection (wherever maximum deflection occurs) for the vertical sidewall load test.

5. Conduct the lateral sidewall pressure, vertical sidewall load and cover vertical load tests without any removable or permanent wall to wall supporting beams located in the interior or top of the box opening.

When testing pull and splice boxes of various sizes (width x length x depth), the cover impact test, internal equipment protection test, coefficient of friction test, and all environmental tests, can be completed using a single representative box/cover (instead of samples from all box/cover sizes) as long as the test report indicates the following:

1. Materials of construction, compositions, and manufacturing processes are identical for all box and cover sizes submitted for listing on the APL

2. Size (width x length x depth) of the representative box/cover.

### **996-6 Camera Lowering Device.**

**996-6.1 General:** Camera lowering devices shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

The lowering device shall provide the electrical connection between the control cabinet and the equipment installed on the lowering device without reducing the function or effectiveness of the equipment. The lowering device system support arm shall be capable of withstanding service tension and shear up to 1 kip minimum.

The lowering device shall include a disconnect unit and power, data, and video cables (as applicable) for connecting equipment, a divided support arm, pole attachment provisions, a rotatable pole-top tenon, and a pole-top junction box.

All external components shall be made of corrosion-resistant materials that are powder-coated, galvanized, or otherwise protected from the environment. All finished castings shall have a smooth finish free from cracks, blow-holes, shrinks, and other flaws. All roller fairlead frames shall be corrosion resistant stainless steel or aluminum. All pulleys used in the lowering device and portable lowering tool shall have sealed, self-lubricated or oil-tight bearings, or sintered bronze bushings.

A minimum of 100 feet of composite power and signal cable prewired to the lowering device at the factory shall be provided. Splices will not be allowed.

Lowering devices shall be designed to withstand the design wind speeds defined in the Department's Structures Manual.

Lowering devices shall be marked with manufacturer name or trademark, model or part number, date of manufacture, and serial number.

**996-6.2 Equipment Connection Box:** A 1-1/2 inch National Pipe Thread (NPT) pipe connection point for attaching a camera shall be included. The equipment connection box shall have an ingress protection rating of no less than IP55.

**996-6.3 Disconnect Unit:** The disconnect units shall have a minimum load capacity of 600 pounds with a 4:1 safety factor and be capable of securely holding the lowering device and any installed equipment. Fixed and movable components of the disconnect unit shall have a locking mechanism between them, with at least two mechanical latches for the movable assembly. The fixed unit shall have a heavy-duty cast tracking guide that allows latching in the same position each time. The load shall be transferred from the lowering cable to the mechanical latches when the system is in the latched position. Interface and locking components shall be constructed of stainless steel or aluminum.

**996-6.3.1 Disconnect Unit Housing:** The disconnect unit housing shall be weather-proof with an ingress protection rating of no less than IP55.

**996-6.3.2 Connector Block:** Modular, self-aligning and self-adjusting female and male socket contact halves in the connector block shall be provided. Equip the lowering device with enough contacts to permit operation of all required functions of the camera, up to a

maximum of 20 contacts and include at least two spare contacts. Contact connections between the fixed and movable lowering device components that are capable of passing EIA-232, EIA-422, EIA-485, and Ethernet data signals and 1 volt peak to peak (Vp-p) video signals, as well as 120 V<sub>AC</sub>, 9-24 V<sub>AC</sub>, and 9-48 V<sub>DC</sub> power shall be provided. The lowering device connections shall be capable of carrying the signals, voltages, and current required by the devices connected to them under full load conditions.

Only corrosion-resistant stainless steel hardware shall be used. male contacts used for grounding shall mate first and break last. All contacts and connectors shall be self-aligning and self-adjusting mechanical systems. A spring-assisted contact assembly to maintain constant pressure on the contacts when the device is in the latched position shall be provided.

Connector pins made of brass- or gold-plated nickel, or gold-plated copper shall be provided.

Current-carrying male and female contacts shall be a minimum of 0.09 inch in diameter and firmly affixed to the connector block. Ensure mated connectors do not allow water penetration.

**996-6.4 Lowering Tool:** A portable metal-frame lowering tool manufactured of corrosion-resistant materials with winch assembly and a cable with a combined weight less than 35 lbs that is capable of securely supporting itself and the load shall be provided. The lowering tool shall include a quick release cable connector, and a torque limiter that will prevent over-tensioning of the lowering cable and be equipped with gearing that reduces the manual effort required to operate the lifting handle to raise and lower a capacity load. Ensure that the lowering tool can be powered using a 1/2-inch chuck, variable-speed reversible industrial-duty electric drill capable of matching the manufacturer-recommended revolutions per minute. An adapter with a clutch mechanism and torque limiter for use with the drill shall be provided.

The winch assembly shall have a minimum drum size width of 3.75 inches and a positive braking mechanism to secure the cable reel during raising and lowering operations, and to prevent freewheeling. The lowering cable shall wind evenly on the winch drum during operation. Provide a manual winch handle that incorporates a non-shear pin type torque limiter that can be used repeatedly and will not damage the lowering system.

Provide a minimum of one lowering tool and any additional tools required to operate the lowering device.

**996-6.5 Lowering Cable:** The lowering cable shall be 0.125-inch minimum diameter Type 316 stainless steel aircraft cable (7 strands x 19 gauge) with a minimum breaking strength of 1,760 pounds. Additionally, the lowering cable assembly (as installed with thimble and crimps on one end and a cable clamp inside the latch on the lowering device end), shall have a minimum breaking strength of 1,760 lbs.

All lowering cable accessories, such as connecting links, shall have a minimum workload rating that meets or exceeds that of the lowering cable.

Prefabricated components for the lift unit support system shall prevent the lifting cable from contacting the power or video cables.

**996-6.6 Wiring:** All wiring must meet NEC requirements.

**996-6.7 External-Mount Lowering System Enclosure for Mounting to Existing Structures:** The system shall include an upper mounting/junction box, winch assembly and all external conduit and cabling necessary for mounting to existing structures.

A NEMA 4 rated lower lockable pole-mounted cabinet, constructed of corrosion-resistant 5052 sheet aluminum with a minimum thickness of 1/8 inch, to house the winch assembly shall be provided. The cabinet shall allow for unobstructed operation of the winch, access for servicing and provide sufficient clear area for operation of the winch manually and with an electric drill. The outside surface of the cabinet shall have a smooth, uniform natural aluminum finish. All inside and outside edges of the winch cabinet shall be free of burrs, and all welds must be neatly formed, free of cracks, blow holes, and other irregularities. Cabinet hinges shall be vandal-resistant and constructed of 14 gauge stainless steel or 1/8 inch aluminum with stainless steel hinge pins.

The cabinet door shall be double-flanged and include neoprene closed-cell gaskets permanently secured on the interior door surfaces that contact the door opening. The cabinet door shall not sag. Include a pin tumbler lock keyed for use with a No. 2 key and two keys. The cabinet door handle shall include a lock hasp that will accommodate a padlock with a 7/16-inch diameter shackle.

The upper mounting/junction box shall include a maintenance access door with captive attachment hardware. All necessary mounting hardware, conduits, standoffs, and conduit mounts required for a complete and functional system shall be provided.

The external conduit shall be galvanized Schedule 40 with National Pipe Thread Taper (NPT) threads and have a minimum ID of 3 inches at the lower winch cabinet entrance and allow the lowering cable to wind evenly on the winch drum without binding. All conduit couplings and connections between the pole-mounted cabinet and upper mounting/junction box shall be watertight.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **008**  
Proposed Specification: **SP0080307DRB Prosecution and Progress - Prosecution of Work – Dispute Review Board.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Olivia Townsend from the Construction Office to update the language to be consistent with the Department's Three-Party Agreement.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## PROSECUTION AND PROGRESS - PROSECUTION OF WORK - DISPUTES REVIEW BOARD.

(REV 2-9-21)

ARTICLE 8-3 is expanded by the following new Subarticle:

**8-3.7 Disputes Review Board:** For this Contract, a Disputes Review Board (Board) will be established to assist in the resolution of disputes and claims arising out of the work on the Contract and will operate under the latest version of the Department's 'DRB Operation Procedures' posted online and be available for regular Board project meetings, virtual meetings and hearings.

**8-3.7.1. Purpose:** The Board will provide special expertise to assist in and facilitate the timely and equitable resolution of disputes and claims between the Department and the Contractor (Parties) in an effort to avoid construction delay and future claims.

It is not intended for the ~~Department or the Contractor~~Parties to default on their normal responsibility to cooperatively and fairly settle their differences by indiscriminately assigning them to the Board. It is intended that the Board encourage the ~~Department and Contractor~~Parties to resolve potential disputes or claims without resorting to this alternative resolution procedure.

~~The Board will be used when normal Department Contractor dispute or claim resolution is unsuccessful. Either the Department or the Contractor may refer a dispute or claim to the Board. Referral to the Board should be initiated as soon as it appears that the normal dispute resolution effort is not succeeding. Referral to the Board is accomplished by providing a position paper outlining the nature and scope of the dispute or claim and describing the basis for entitlement to the dispute or claim. Only disputes or claims that have been duly preserved under the terms of the Contract as determined by the Board will be eligible to be heard by the Board. Requests for equitable adjustment must be certified as required by 4-3.2. Claims that are referred to the Board must be in compliance with 5-12. It is a condition of this Contract that the parties shall use the Dispute Review Board. The completed DRB hearing of any unresolved dispute or claims is a condition precedent to the Department or the Contractor having the right to initiate arbitration, other alternative resolution procedures, or to file a lawsuit, as provided by law, on such unresolved disputes or claims.~~

~~The recommendations of the Board will not be binding on either the Department or the Contractor unless otherwise stated in the Contract.~~

~~The Board will fairly and impartially consider disputes or claims referred to it and will provide written recommendations to the Department and Contractor to assist in the resolution of these disputes or claims.~~

**8-3.7.2 Disputes Resolution:** The Board will be used when normal dispute or claim resolution is not succeeding. It is a condition of this Contract that the Parties shall use the Dispute Review Board. Either Party may refer a dispute or claim to the Board.

**8-3.7.2.1 Advisory Opinions:** At the request of either Party, the Board may provide a preliminary informal review to assist in the early resolution of any emerging disputes through an Advisory Opinion. Advisory Opinions may be provided during any regularly scheduled project meeting- provided that the Party requesting the Advisory Opinion informs the Board and the other Party of the disputed issue at least one week before the meeting at which an Advisory Opinion will be sought.

Advisory Opinions will be informal oral discussions between the Board and the Parties in the presence of all parties. No formal position papers, written summaries, or presentations of any kind shall be provided to the Board and no written findings or recommendations will be provided from the Board to the Parties.

The Board will fairly and impartially consider emerging disputes referred to it and will provide informal Advisory Opinions to the Parties to assist in the resolution of these emerging disputes.

Advisory Opinions provided by the Board will not be binding on either Party.

If the Board is later called upon to issue a recommendation in connection with an emerging dispute on which it has provided an Advisory Opinion, the Board shall not be bound by any previous statements, discussions, or opinions that it may have made in the course of an Advisory Opinion, nor shall it take into account any prior Advisory Opinions in the consideration of a formal recommendation.

**8-3.7.2.2 Disputes Review Hearings:-** Only disputes or claims that have been duly preserved under the terms of the Contract as determined by the Board will be eligible to be heard by the Board. Disputes or claims shall be referred to the Board by providing a position paper outlining the nature and scope of the dispute or claim and describing the basis for entitlement to the dispute or claim. Claims that are referred to the Board must be in compliance with 5-12. Requests for equitable adjustment must be certified as required by 4-3.2.

Either party furnishing any written evidence or documentation to the Board must do so a minimum of 15 days prior to the date of the hearing for the dispute, and will at the same time furnish copies of such information to the other party. If the Board requests any additional documentation or evidence prior to, during, or after the hearing, the Party will provide the requested information to the Board and to the other Party.

The Board will fairly and impartially consider disputes or claims referred to it and will provide written recommendations to the Parties within 15 days completion of the hearing to assist in the resolution of these disputes or claims. In cases of extreme complexity, both Parties may agree to allow additional time for the Board to formulate its recommendations.

Recommendations provided by the Board will not be binding on either Party.

Within 15 days of receiving the Board's recommendations, both Parties will accept or reject the recommendations by responding to the other and to the Board in writing. The failure of either Party to reject within the 15-day period will be deemed an acceptance of the Board's recommendations by that party and shall preclude any further pursuit of this issue before this Board or any successive Board.

For disputes involving non-compensable time extensions, the Department will resolve the dispute in a good-faith manner regardless of its acceptance or rejection of the Board's recommendations.

If Entitlement is determined by the Board, the Parties should proceed to negotiate monetary changes within 60 -calendar days. If both Parties are unable to successfully negotiate monetary changes within 60- calendar days, the Board shall be notified of the impasse, and upon the request of both Parties shall then proceed to schedule a hearing to make a recommendation as to monetary damages.



If the ~~Department and the Contractor~~ Parties resolve the dispute with or without the aid of the Board's recommendations, the Department will promptly process any required changes to the Contract.

Requests for reconsideration of a Board recommendation may only be made when there is new evidence to present. The completed DRB hearing of any unresolved dispute or claims is a condition precedent to ~~the Department or the Contractor~~ a Party having the right to initiate arbitration, other alternative resolution procedures, or to file a lawsuit, as provided by law, on such unresolved disputes or claims. In addition, all written recommendations of the Board will be admissible as evidence in any subsequent arbitration, or circuit proceedings, as provided by law.

### **8-3.7.3 Meetings:**

**8-3.7.3.1 Project Meetings:** Meetings will be held at intervals as mutually agreed to by the Parties but will occur not less than quarterly. Each meeting will consist of an informal round table discussion and a field inspection of the work. The round table discussion will be attended by selected personnel from both Parties.

For projects without unresolved or emerging disputes, ~~the~~ Board will meet a minimum of ~~me~~ monthly for the first three to six months. At that agreed upon milestone, the meeting frequency may be reassessed ~~by the DEPARTMENT and the CONTRACTOR~~ with continued meeting frequency set at not less than the quarterly interval.

~~On~~ For projects with unresolved or emerging disputes, the ~~BOARD~~ Board will meet, at least monthly, until the ~~unresolved~~ disputes are resolved.

**8-3.7.3.2 Project Site Visits:** The Board will visit the project site to keep abreast of construction activities and to develop a familiarity with the work in progress. The frequency, exact time, and duration of these visits ~~shall~~ will be as mutually agreed ~~between the~~ to by the ~~DEPARTMENT and the CONTRACTOR~~ Parties.

**8-3.7.23. Continuance of Work:** During the course of the ~~Disputes Review~~ Board process, the Contractor will continue with the work as directed by the Engineer in a diligent manner and without delay or otherwise conform to the Engineer's decision or order, and will be governed by all applicable provisions of the Contract. Throughout any protested work, the Contractor will keep complete records of extra costs and time incurred. The Contractor will permit the Engineer and Board access to these and any other records needed for evaluating the disputes and claims.

**8-3.7.34. Membership:** The ~~Disputes Review~~ Board will consist of one member selected by the Department and approved by the Contractor, and one member selected by the Contractor and approved by the Department. The first two members will mutually select and agree on the third member. Normally, the third member will act as Chairman for all Board activities.

**8-3.7.45 Qualification:** It is desirable that all Board members have at least ten years of experience with the type of construction involved in this project, in the interpretation of Contract Documents, and in contract dispute resolution. Board members must have attended the Dispute Resolution Board Foundation's Administration and Practices Workshop and must be on the Department's Lists of Candidate Members as provided on the Department's website. The goal in selecting the third member is to complement the construction experience of the first two members, to provide leadership for the Board's activities, and to provide expertise in the area of administering alternative contract resolution proceedings. It is imperative that Board members

not show or be perceived as showing partiality to either the Contractor or the Department. A Board member shall not have any conflict of interest, which could affect their ability to act in a disinterested and unbiased manner.

**8-3.7.5-6 Conflict of Interest:** A person selected to the Board shall submit to the party appointing him/her a resume covering his/her applicable education and experience, a list of all DRBs, with meeting frequencies, on which he/she currently serves, and a disclosure statement covering, but not limited to, any of the following categories of relationships or prior involvement in this project:

a. Any direct or indirect ownership or financial interest in the Contractor awarded the project, the CEI consulting firm on the project, any subcontractor or supplier on the project or any business of another Board member.

b. Current employment by the Department, the Contractor awarded the contract, or the CEI consulting firm on the project. Service as a Dispute Review Board Member shall not be construed to be employment.

c. Current employment by any subcontractor or supplier on the project.

d. Current employment by a consulting engineering firm that will be seeking future contracts for CEI services from the Department.

e. Within the two year period immediately prior to award of the contract, employment by: the Central Office of the Department; the Department's District or Turnpike in which the project is located; the Department, as a consultant in the District or Turnpike in which the project is located; the Contractor awarded the contract, the CEI consulting firm on the project, any subcontractor or supplier on the project or any business of another Board member. Service as a Dispute Review Board Member shall not be construed to be employment.

f. A close personal relationship with any key individual in any firm involved in the contract.

g. A prior involvement in the project of a nature, which might be construed as compromising his/her ability to act impartially in carrying out the duties of the Board.

h. A contract as a consultant to the Contractor awarded the contract.

i. A contract as a consultant with any subcontractor or supplier on the project.

j. Current full-time employment by a Department prequalified contractor or consultant.

**8-3.7.6-7 Disqualification:** Category a, b, c, e, and j relationships listed in 8-3.7.5 shall disqualify a person from serving on the Board for this project. The other categories of relationships or prior involvement in this project listed above will be considered by the ~~Contractor and the Department~~ **Parties** in arriving at their decision as to whether or not to accept a person as a member of the Board.

If during the life of the contract, a Board member is made aware that a firm of which he/she is an employee is involved in the contract as a subcontractor or supplier, he/she shall immediately give notice to the ~~Department and the Contractor~~ **Parties**. Upon receiving such notification, ~~the Department or the Contractor~~ **either Party** may, within ten (10) days, give notice that this Board member is no longer acceptable and a new Board member shall be selected and

approved as provided above. In no event, shall a Board member participate in a hearing by the Board of dispute involving a firm by which he is employed.

The Department may disqualify a person from serving on future Disputes Review Boards for Department projects who submits a disclosure statement which fails to provide accurate and complete disclosure of a relationship that prohibits him/her from serving on the Board for this project or one of the possible conflicts of interest listed above.

**8-3.7.7.8 Selection of Members:** Every attempt shall be made by the ~~Department and the Contractor~~Parties to complete the selection of ~~Disputes Review~~ Board members and execute the Three-Party Agreement prior to date of the preconstruction conference and, if applicable, the initial partnering workshop. The ~~Department and the Contractor~~Parties shall select their Board members and give the other party notice of the person they have selected to serve as a member of the Board. This notice shall be accompanied by the resume and disclosure statement submitted by that person.

Within ten (10) days of receiving the notice of selection of a Board member, the ~~Department and the Contractor~~Parties shall review the accompanying resume and disclosure statement, make such inquiries as each deems necessary and notify the other party in writing as to whether or not the person selected is acceptable. Failure to give this notice within the ten (10) days allowed shall be construed to be acceptance.

If a person selected is not acceptable to the other party, the party who selected that person shall within five (5) days select another person and provide to the other party to the contract a notification accompanied by a resume and disclosure statement.

Once the ~~Contractor and the Department~~Parties have agreed upon the first two members of the Board they shall immediately notify those members of their approval. Within one week of this notification, the first two members of the Board shall select the third member and give written notice to the ~~Contractor and the Department~~Parties accompanied by that person's resume and disclosure statement.

Within ten (10) days of receiving the notice of selection of a third member of the Board, the ~~Department and the Contractor~~Parties shall review the accompanying resume and disclosure statement, make such inquiries as each deems necessary and notify the first two members in writing as to whether or not the person selected is acceptable. If a person selected is not acceptable to the ~~Contractor or the Department~~Parties the first two members of the Board shall immediately select another person and provide notification accompanied by a resume and disclosure statement. Failure to give this notice within the ten (10) days allowed shall be construed to be acceptance.

If, (1) the ~~Department or the Contractor~~either Party -fails to provide the other party notice of selection of a Board Member within the time specified, herein; (2) the first two members of the Board fail to provide notice to the parties of their selection of the third member of the Board within the times specified, herein; or (3) the parties are unable to agree on appointment of a Board member within 60 days after award of the contract, that member shall be appointed by mutual consent of the Department's State Construction Engineer and the President of the Florida Transportation Builders Association.

Immediately after agreement is reached on all members of the Board the Contractor, the Department and the members of the Board shall proceed with execution of a Three Party Agreement as provided on the Department's website. The execution of this agreement will not modify the requirements, terms or conditions of this Specification.

If during the life of the contract, a Board member has a discussion regarding employment or entered into any agreement for employment after completion of the contract with the Department, the Contractor or any subcontractor or supplier on the project, he/she shall immediately disclose this to the Contractor and the Department and shall be disqualified from serving on the Board.

Should the ~~Department and the Contractor~~ **Parties** mutually agree to terminate a Disputes Review Board Three Party Agreement, the existing Disputes Review Board Three Party Agreement will remain in force until replaced by another a fully executed Disputes Review Board Three Party Agreement. If, after the Department has made final acceptance of the project, there are unresolved disputes and claims remaining, the Disputes Review Board Three Party Agreement shall remain active and in full force and effect until the project is otherwise administratively closed by the Department following final payment so that the Board may continue in operation until all unresolved disputes and claims are resolved.

**8-3.7.8-9 Limitation for Referral of Disputes or Claims to the Board:** Any disputes or claims that were not resolved prior to Final Acceptance of the project pursuant to 5-11 must be referred to the Board within 90 calendar days after Final Acceptance on projects with an original Contract amount of \$3,000,000 or less, and within 180 calendar days after Final Acceptance on projects with an original Contract amount greater than \$3,000,000. Only duly-preserved disputes or claims will be eligible to be heard by the Board. Failure to submit all disputes or claims to the Board within aforementioned timeframe after Final Acceptance constitutes an irrevocable waiver of the Contractor's dispute or claim.

**8-3.7.9-10 Basis of Payment:** A per day cost of \$3,900 **for the Contract** has been established by the Department to reimburse the Contractor for providing compensation to the three members of the Disputes Review Board. This amount will be paid to the Contractor for each day the ~~Disputes Review~~ Board is convened for regular DRB project meetings. For each day of the meeting, the Contractor shall compensate each ~~Disputes Review~~ Board member a sum of \$1,300. Such payment will be full compensation to the Board member for salary and all travel expenses (air fare, rental or personal automobile, motel room, meals, etc.) related to membership on the Board. Do not pay prior to the execution of the Three Party Agreement.

A per hearing cost of \$9,000 **for the Contract** has been established by the Department for providing compensation for all members of the Dispute Review Board for participation in an actual hearing. The Board chairman will receive \$3,500 for participation in the hearing while the remaining two members will receive \$2,750 each. The Department and the Contractor will equally provide compensation to the Board for participation in an actual hearing. The Department will compensate the Contractor \$4,500 as its contribution to the hearing cost. Such payment will be full and complete compensation to the Board members for all expenses related to the hearing. This includes travel, accommodations, meals, pre- and post- hearing work, review of position papers and any rebuttals, conducting the hearing, drafting and issuance of recommendations, readdressing any requests for clarification. It is not intended for hearings to last longer than a single day, however, in some cases they may. Any additional time and/or compensation for a hearing would only be allowed upon prior written approval of the Department and the Contractor. If an additional day(s) is granted for the hearing, it will be at \$3,900 per day, regular meeting rate, payment of which is equally split between the Department and the Contractor.

The Department will prepare and mail minutes and progress reports, will provide administrative services, such as conference facilities and secretarial services, and will bear the cost of these services.

If the Board desires special services, such as legal consultation, accounting, data research, and the like, both parties must agree, and the costs will be shared by them as mutually agreed.

Payment shall be made under:

Item No. 999- 20- 1 Disputes Review Board meeting - per day.

Item No. 999- 20- 2 Disputes Review Board hearing - per each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **008**  
Proposed Specification: **SP0080307RDRB Prosecution and Progress - Prosecution of Work – Regional Dispute Review Board.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Olivia Townsend from the Construction Office to update the language to be consistent with the Department's Three-Party Agreement.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PROSECUTION AND PROGRESS - PROSECUTION OF WORK – REGIONAL  
DISPUTES REVIEW BOARD.**

**(REV 2-8-20)**

ARTICLE 8-3 is expanded by the following new Subarticle:

**8-3.7 Regional Disputes Review Board:** For this Contract, a Disputes Review Board (Board) will be available to assist in the resolution of disputes and claims arising out of the work on the Contract.

**8-3.7.1 Purpose:** The Board will provide special expertise to assist in and facilitate the timely and equitable resolution of disputes and claims between the Department and the Contractor (Parties) in an effort to avoid construction delay and future claims.

It is not intended that the ~~Department or the Contractor~~Parties default on their normal responsibility to cooperatively and fairly settle their differences by indiscriminately assigning them to the Board. It is intended that the Board encourage the ~~Department and Contractor~~Parties to resolve potential disputes or claims without resorting to this alternative resolution procedure.

**8-3.7.2 Disputes Resolution:** The Board will be used when normal dispute or claim resolution is not succeeding. It is a condition of this Contract that the Parties shall use the Board. Either Party may refer a dispute or claim to the Board for a disputes review hearing. Disputes and claims will be considered as quickly as possible, taking into consideration the particular circumstances and the time required to prepare detailed documentation. Steps may be omitted as agreed by the Parties and the time periods stated below may be shortened in order to hasten resolution.

If the Contractor objects to any decision, action or order of the Engineer, the Contractor may file a written protest with the Engineer, stating clearly and in detail the basis for the objection, within 15 calendar days after the event. The Engineer will consider the written protest and make his decision on the basis of the pertinent contract provisions, together with the facts and circumstances involved in the dispute or claim. The Engineer's decision will be furnished in writing to the Contractor within 15 calendar days after receipt of the Contractor's written protest. This decision will be final and conclusive on the subject, unless a written appeal to the Engineer is filed by the Contractor within 15 calendar days of receiving the decision.

**8-3.7.2.1 Disputes Review Hearings:** Only disputes or claims that have been duly preserved under the terms of the Contract as determined by the Board will be eligible to be heard by the Board. Disputes or claims shall be referred to the Board by providing a position paper outlining the nature and scope of the dispute or claim and describing the basis for entitlement to the dispute or claim. Claims that are referred to the Board must be in compliance with 5-12. Requests for equitable adjustment must be certified as required by 4-3.2.

Either Party furnishing any written evidence or documentation to the Board must do so a minimum of 15 calendar days prior to the date of the hearing for the dispute, and will at the same time furnish copies of such information to the other Party. Additionally, either party furnishing any written evidence or documentation to the Board must do so a minimum of 15 calendar days prior to the date of the hearing for the dispute, and will at the same time furnish copies of such information to the other Party. If the Board requests any additional documentation or evidence prior to, during, or after the hearing, the Party will provide the

requested information to the Board and to the other Party.

Both Parties will each be afforded an opportunity to be heard by the Board and to offer evidence. Neither Party may present information at the hearing that was not previously distributed to both the Board and the other Party.

The Board will fairly and impartially consider disputes or claims referred to it and will provide written recommendations to the Parties within 15 calendar days of completion of the hearing to assist in the resolution of these disputes or claims. The Board will focus its attention in the written report to matters of entitlement and allow the parties to determine the monetary damages. In cases of extreme complexity, both Parties may agree to allow additional time for the Board to formulate its recommendations.

Recommendations provided by the Board will not be binding on either Party.

Within 15 calendar days of receiving the Board's recommendations, both Parties will accept or reject the recommendations by responding to the other and to the Board in writing. The failure of either Party to reject within the 15-day period will be deemed an acceptance of the Board's recommendations by that Party and shall preclude any further pursuit of this issue before this Board or any successive Board.

For disputes involving non-compensable time extensions, the Department will resolve the dispute in a good-faith manner regardless of its acceptance or rejection of the Board's recommendations.

If Entitlement is determined by the Board, the Parties should proceed to negotiate monetary changes within 60 calendar days. If both Parties are unable to successfully negotiate monetary changes within 60 calendar days, the Board shall be notified of the impasse, and upon the request of both Parties shall then proceed to schedule a hearing to make a recommendation as to monetary damages.

If the Parties resolve the dispute with or without the aid of the Board's recommendations, the Department will promptly process any required changes to the Contract.

Requests for reconsideration of a Board recommendation may only be made when there is new evidence to present. The completed hearing of any unresolved dispute or claims is a condition precedent to a Party having the right to initiate arbitration, other alternative resolution procedures, or to file a lawsuit, as provided by law, on such unresolved disputes or claims. In addition, all written recommendations of the Board will be admissible as evidence in any subsequent arbitration, or circuit proceedings, as provided by law.

**8-3.7.3 Contractor Responsibility:** The Contractor shall furnish to each Board member a set of all pertinent documents which are or may become necessary for the Board, except documents furnished by Department, to perform their function. Pertinent documents are any drawings or sketches, calculations, procedures, schedules, estimates, or other documents which are used in the performance of the work or in justifying or substantiating the Contractor's position. A copy of such pertinent documents must also be furnished to the Department.

Except for its participation in the Board's activities as provided in the construction Contract and in this Agreement, the Contractor will not solicit advice or consultation from the Board or any of its members on matters dealing in any way with the project, the conduct of the work or resolution of problems.

**8-3.7.4 Department Responsibilities:** Except for its participation in the Board's activities as provided in the Contract and in this Three Party Agreement, the Department will not



solicit advice or consultation from the Board or any of its members on matters dealing in any way with the project, the conduct of the work or resolution of problems.

The Department shall furnish the following services and items:

a. Contract Related Documents: The Department shall furnish each Board member a copy of all Contract Documents, supplemental agreements, written instructions issued by the Department to the Contractor, or other documents pertinent to the performance of the Contract and necessary for the Board to perform their function. A copy of such pertinent documents must also be furnished to the Contractor.

b. Coordination and Services: The Department, in cooperation with the Contractor, will coordinate the operations of the Board. The Department, through the Project Engineer, will arrange or provide conference facilities at or near the Contract site and provide secretarial and copying services.

~~—————The Board will be used when normal Department Contractor dispute or claim resolution is unsuccessful. Either the Department or the Contractor may refer a dispute or claim to the Board. Referral to the Board should be initiated as soon as it appears that the normal dispute resolution effort is not succeeding. Referral to the Board is accomplished by providing a position paper outlining the nature and scope of the dispute or claim and describing the basis for entitlement to the dispute or claim. Only disputes or claims that have been duly preserved under the terms of the Contract as determined by the Board will be eligible to be heard by the Board. Requests for equitable adjustment must be certified as required by 4-3.2. Claims that are referred to the Board must be in compliance with 5-12. It is a condition of this Contract that the parties shall use the Dispute Review Board. consider disputes or claims referred to it and will provide written recommendations to the to assist in the resolution of these disputes or claims. The completed DRB hearing of any unresolved disputes or claims is a condition precedent to the Department or the Contractor having the right to initiate arbitration, other alternative resolution procedures, or to file a lawsuit, as provided by law on such unresolved disputes or claims.~~

~~—————The recommendations of the Board will not be binding on either the Department or the Contractor.~~

~~—————The Board will fairly and impartially and without regard to how or by whom they may have been appointed, consider disputes or claims referred to it and will provide written recommendations to the Department and Contractor to assist in the resolution of these disputes or claims.~~

**8-3.7.2-65 Continuance of Work:** During the course of the ~~Disputes Review~~ Board's process, the Contractor will continue with the work as directed by the Engineer in a diligent manner and without delay or otherwise conform to the Engineer's decision or order, and will be governed by all applicable provisions of the Contract. Throughout any protested work, the Contractor will keep complete records of extra costs and time incurred. The Contractor will permit the Engineer and Board access to these and any other records needed for evaluating the disputes or claims.

**8-3.7.3-76 Membership:** The ~~Disputes Review~~ Board will consist of members pre-selected by the Engineer and the President of the Florida Transportation Builders' Association (FTBA), and posted on the Department's Website.

If during the life of the contract, a Board member has a discussion regarding employment or entered into any agreement for employment after completion of the contract with the Department, the Contractor or any subcontractor or supplier on the project,

he/she shall immediately disclose this to the Contractor and the Department and shall be disqualified from serving on the Board.

Once established, the Board will remain active and in full force and effect. If, after the Department has made final acceptance of the project, there are unresolved disputes and claims remaining, the ~~Disputes Review~~ Board shall remain active and in full force and effect until the project is otherwise administratively closed by the Department following final payment so that the Board may continue in operation until all unresolved disputes and claims are resolved.

~~8-3.7.4 Procedure and Schedules for Disputes Resolution: Disputes and claims will be considered as quickly as possible, taking into consideration the particular circumstances and the time required to prepare detailed documentation. Steps may be omitted as agreed by the Department and the Contractor and the time periods stated below may be shortened in order to hasten resolution.~~

~~a. If the Contractor objects to any decision, action or order of the Engineer, the Contractor may file a written protest with the Engineer, stating clearly and in detail the basis for the objection, within 15 days after the event.~~

~~b. The Engineer will consider the written protest and make his decision on the basis of the pertinent contract provisions, together with the facts and circumstances involved in the dispute or claim. The Engineer's decision will be furnished in writing to the Contractor within 15 days after receipt of the Contractor's written protest.~~

~~c. This decision will be final and conclusive on the subject, unless a written appeal to the Engineer is filed by the Contractor within 15 days of receiving the decision. Should the Contractor preserve its protest of the Engineer's decision, the matter can be referred to the Board by either the Department or the Contractor.~~

~~d. Upon receipt by the Board of a written duly preserved protest of a dispute or claim, either from the Department or the Contractor, it will first be decided when to conduct the hearing.~~

~~e. Either party furnishing any written evidence or documentation to the Board will furnish copies of such information to the other party a minimum of 15 days prior to the date the Board sets to convene the hearing for the dispute or claim. If the Board requests any additional documentation or evidence prior to, during, or after the hearing, the Department and/or Contractor will provide the requested information to the Board and to the other party.~~

~~f. The Contractor and the Department will each be afforded an opportunity to be heard by the Board and to offer evidence. Neither the Department nor the Contractor may present information at the hearing that was not previously distributed to both the Board and the other party.~~

~~g. The Board's recommendations for resolution of the dispute or claim will be given in writing to both the Department and the Contractor, within 15 days of completion of the hearings. In cases of extreme complexity, both parties may agree to allow additional time for the Board to formulate its recommendations. The Board will focus its attention in the written report to matters of entitlement and allow the parties to determine the monetary damages. If both parties request, and sufficient documentation is available, the Board may make a recommendation of monetary damages.~~

~~h. Within 15 days of receiving the Board's recommendations, both the Department and the Contractor will respond to the other and to the Board in writing, signifying either acceptance or rejection of the Board's recommendations. The failure of either party to respond within the 15-day period will be deemed an acceptance of the Board's recommendations.~~

by that party. If the Department and the Contractor are able to resolve the dispute or claim with or without the aid of the Board's recommendations, the Department will promptly process any required Contract changes.

~~i. Should the dispute or claim remain unresolved, either party may seek reconsideration of the decision by the Board only when there is new evidence to present. No provisions in this Specification will abrogate the Contractor's responsibility for preserving the request for equitable adjustment in accordance with 4-3.2 or the Contractor's responsibility for preserving a claim filed in accordance with 5-12.~~

~~Although both the Department and the Contractor should place great weight on the Board's recommendation, it is not binding. If the Board's recommendations do not resolve the dispute or claim, all records and written recommendations of the Board will be admissible as evidence in any subsequent dispute resolution procedures.~~

~~**8-3.7.5 Contractor Responsibility:** The Contractor shall furnish to each Board member a set of all pertinent documents which are or may become necessary for the Board, except documents furnished by Department, to perform their function. Pertinent documents are any drawings or sketches, calculations, procedures, schedules, estimates, or other documents which are used in the performance of the work or in justifying or substantiating the Contractor's position. A copy of such pertinent documents must also be furnished to the Department.~~

~~Except for its participation in the Board's activities as provided in the construction Contract and in this Agreement, the Contractor will not solicit advice or consultation from the Board or any of its members on matters dealing in any way with the project, the conduct of the work or resolution of problems.~~

~~**8-3.7.6 Department Responsibilities:** Except for its participation in the Board's activities as provided in the construction Contract and in this Agreement, the Department will not solicit advice or consultation from the Board or any of its members on matters dealing in any way with the project, the conduct of the work or resolution of problems.~~

~~The Department shall furnish the following services and items:~~

~~a. Contract Related Documents: The Department shall furnish each Board member a copy of all Contract Documents, supplemental agreements, written instructions issued by the Department to the Contractor, or other documents pertinent to the performance of the Contract and necessary for the Board to perform their function. A copy of such pertinent documents must also be furnished to the Contractor.~~

~~b. Coordination and Services: The Department, in cooperation with the Contractor, will coordinate the operations of the Board. The Department, through the Project Engineer, will arrange or provide conference facilities at or near the Contract site and provide secretarial and copying services.~~

**8-3.7.7 Limitation for Referral of Disputes or Claims to the Board:** Any disputes or claims that were not resolved prior to Final Acceptance of the project pursuant to 5-11 must be referred to the Board within 90 calendar days after Final Acceptance for projects with an original Contract amount of \$3,000,000 or less, and within 180 calendar days after Final Acceptance on projects with an original Contract amount greater than \$3,000,000. Only duly preserved disputes or claims will be eligible to be heard by the Board. Failure to submit all disputes or claims to the Board within aforementioned timeframe after Final Acceptance constitutes an irrevocable waiver of the Contractor's dispute or claim.

**8-3.7.8 Basis of Payment:** A per hearing cost of \$9,000 for the Contract has been established by the Department for providing compensation for all members of the Dispute

~~Review~~ Board for participation in an actual hearing. The Board chairman will receive \$3,500 for participation in the hearing while the remaining two members will receive \$2,750 each. The ~~Department and the Contractor~~Parties will equally provide compensation to the Board for participation in an actual hearing. The Department will compensate the Contractor \$4,500 as its contribution to the hearing cost. Such payment will be full and complete compensation to the Board members for all expenses related to the hearing. This includes travel, accommodations, meals, pre- and post- hearing work, review of position papers and any rebuttals, conducting the hearing, drafting and issuance of recommendations, readdressing any requests for clarification. It is not intended for hearings to last longer than a single day, however, in some cases they may. Any additional time and/or compensation for a hearing would only be allowed upon prior written approval of the ~~Department and the Contractor~~Parties. If an additional day(s) is granted for the hearing, it will be at \$3,900 per day, payment of which is equally split between the ~~Department and the Contractor~~Parties. Payment shall be made by issuing a work order against contingency funds set aside for this Contract.

The Department will prepare and mail minutes and progress reports, will provide administrative services, such as conference facilities and secretarial services, and will bear the cost of these services. If the Board desires special services, such as legal consultation, accounting, data research, and the like, both parties must agree, and the costs will be shared by them as mutually agreed.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 22, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **008**  
Proposed Specification: **SP0081000 Prosecution and Progress Liquidated Damages for Failure to Complete the Work.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Ashley Anderson from the State Construction Office to update the Liquidate Damages rate per the Florida Statutes and include language to adjust the rate when all contract work is complete.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us)

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on File

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PROSECUTION AND PROGRESS – LIQUIDATED DAMAGES FOR FAILURE TO COMPLETE THE WORK.**

**(REV 11-5-20)**

SUBARTICLE 8-10.1 and 8-10.2 are deleted and the following substituted:

**8-10 Liquidated Damages for Failure to Complete the Work.**

**8-10.1 Highway Code Requirements Pertaining to Liquidated Damages:**

Section 337.18, paragraph (2) of the Florida Statutes, requires that the Department adopt regulations for the determination of default and provides that the Contractor pay liquidated damages to the Department for any failure of the Contractor to complete the Contract work within the Contract Time. These Code requirements govern, and are herewith made a part of the Contract.

Liquidated damages for this Contract will be a summation of the damages referenced above and projected lost toll revenues due to failure to timely open the project to revenue-producing traffic.

**8-10.2 Amount of Liquidated Damages:** Applicable liquidated damages are the sum of the daily rate of \$ [redacted] per Calendar Day assessed as projected lost toll revenues for failure to complete the Work within the Contract Time plus the amounts established in the following schedule:

Original Contract Amount	Daily Charge Per Calendar Day
\$50,000 and under.....	\$ <del>868</del> 1,015
Over \$50,000 but less than \$250,000.....	\$ <del>882</del> 1,045
\$250,000 but less than \$500,000.....	\$1,1 <del>97</del> 70
\$500,000 but less than \$2,500,000.....	\$1,6 <del>94</del> 0
\$2,500,000 but less than \$5,000,000.....	\$2,5 <del>79</del> 2
\$5,000,000 but less than \$10,000,000.....	\$3,7 <del>85</del> 6
\$10,000,000 but less than \$15,000,000.....	\$4,7 <del>69</del> 344
\$15,000,000 but less than \$20,000,000.....	\$5,8 <del>55</del> 74
\$20,000,000 and over.....	\$9,214 <del>10,203</del> plus 0.00005 of any amount over \$20 million (Round to nearest whole dollar)

The Engineer may approve adjustments to the liquidated damages amounts in accordance with the Construction Project Administration Manual (CPAM) provided all contract work is complete.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 13, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **455**  
Proposed Specification: **REVISED** SP4550000DB Structures Foundations (Design Build).

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Juan Castellanos from the Construction Office to simplify the requirements for the CSL tomography analysis.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STRUCTURES FOUNDATIONS (DESIGN BUILD).**  
**(REV 11-075-210)**

SECTION 455 is deleted and the following substituted:

**SECTION 455**  
**STRUCTURES FOUNDATIONS**

**Index**

<b>A. General.....</b>	<b>455-1 through 455-2</b>
<b>B. Piling.....</b>	<b>455-3 through 455-12</b>
<b>C. Drilled Shafts.....</b>	<b>455-13 through 455-24</b>
<b>D. Spread Footings.....</b>	<b>455-25 through 455-37</b>
<b>E. Structures (Other Than Bridge) Foundations-</b>	
<b>Auger Cast Piles.....</b>	<b>455-38 through 455-50</b>

**A. GENERAL**

**455-1 General Requirement.**

The Contractor may examine available soil samples and/or rock cores obtained during the preliminary soil boring operations at the appropriate District Materials Office or designated storage location.

**455-1.1 Monitor Existing Structures:** Monitor existing structures in accordance with Section 108.

**455-1.2 Excavation:** Complete all excavation of the foundations prior to installing piles or shafts unless otherwise authorized by the Engineer. After completing pile/shaft installation, remove all loose and displaced materials from around the piles/shafts, leaving a clean, solid surface. Compact the soil surface on which concrete is to be placed or which will support the forming system for the concrete to support the load of the plastic concrete without settling or causing the concrete to crack, or as shown in the Contract Documents.

**455-1.2.1 Abutment (End Bent) Fill:** Place and compact the fill before installing end-bent piling/shafts, except when driving specified test piling in end bents or when the Plans show uncased piles through proprietary retaining wall fills.

When installing piles/shafts or casing prior to placing fill, take necessary precautions to prevent displacement of piles/shafts during placing and compacting fill materials within 15 feet of the piles/shafts or casing. Reference and check the position of the piles/shafts or casing at three approximately equal intervals during construction of the embankment.

Place embankment material in 6 inch compacted lifts in the 15 foot area around the piles/shafts or casing. Compact embankment material within the 15 foot area adjacent to the piles/shafts or casing to the required density with compaction equipment weighing less than 1,000 pounds. When installing piles/shafts prior to the completion of the surrounding fills, do not cap them until placing the fills as near to final grade as possible, leaving only the necessary working room for construction of the caps.



When shown in the Plans, provide permanent casings installed prior to placement of the fill, for all drilled shafts through mechanically stabilized fills (for example, behind proprietary retaining walls) for shafts installed after fill placement. Install temporary casings through the completed conventional fill when permanent casings are not required.

Provide permanent casings, if required, before the fill is placed extending a sufficient distance into the existing ground to provide stability to the casings during construction of the abutment fill.

**455-1.3 Cofferdams:** Construct cofferdams as detailed in the Plans. When cofferdams are not detailed in the Plans, employ a qualified Specialty Engineer to design cofferdams, and to sign and seal the plans and specification requirements. Send the designs to the Engineer for his records before beginning construction.

Provide a qualified diver and a safety diver to inspect the conditions of the foundation enclosure or cofferdam when the Contract Documents require a seal for construction. Equip these divers with suitable voice communications, and have them inspect the foundation enclosure and cofferdam periphery including each sheeting indentation and around each piling or drilled shaft to ensure that no layers of mud or other undesirable materials were left above the bottom of seal elevation during the excavation process. Also have the divers check to make sure the surfaces of the piles or drilled shafts are sufficiently clean to allow bond of the concrete down to the minimum bottom of seal elevation. Ensure that there are no mounds of stone, shell, or unapproved backfill material left after placement and grading. Ensure that the seal is placed as specified and evaluate the adequacy of the foundation soils or rock. Correct any deficiencies found by the divers. Upon completion of inspection by the divers, the Department may also elect to inspect the work before authorizing the Contractor to proceed with subsequent construction operations. Submit a written report by the divers to the Engineer indicating the results of their underwater inspection before requesting authorization to place the seal concrete.

**455-1.4 Vibrations on Freshly Placed Concrete (Drilled Shafts and Piers):** Ensure that freshly placed concrete is not subjected to peak particle velocities greater than 1.5 inches per second from vibration sources located within 30 feet (from the nearest outside edge of freshly placed concrete to the vibration source) until that concrete has attained its final set as defined by ASTM C403 except as required to remove temporary casings before the drilled shaft elapsed time has expired.

## **455-2 Static Compression Load Tests.**

**455-2.1 General:** Employ a professional testing laboratory, or Specialty Engineer with prior load test experience on at least three projects, to conduct the load test in compliance with these Specifications, to record all data, and to submit signed and sealed reports of the test results to the Engineer.

Perform the load test by applying a load up to the load required in the Contract Documents or to the failure load, whichever occurs first.

Do not apply test loads to piles sooner than 48 hours (or the time interval shown in the Plans) after driving of the test pile or reaction piles, whichever occurs last.

Do not begin static load testing of drilled shafts until the concrete has attained a compressive strength of 3,400 psi. The Contractor may use high early strength concrete to obtain this strength at an earlier time to prevent testing delays.

Provide all equipment, materials, labor, and personnel required to conduct the load tests, including determination of anchor reaction member depths. In this case, provide a loading apparatus designed to accommodate the maximum load plus an adequate safety factor.

While performing the load test, provide safety equipment, and employ safety procedures consistent with the latest approved practices for this work. Include with these safety procedures, adequate support for the load test plates and jack to prevent them from falling in the event of a release of load due to hydraulic failure, test pile/shaft failure, or any other cause.

**455-2.2 Loading Apparatus:** Provide an apparatus for applying the vertical loads as described in one of the following:

1. As shown and described in the Contract Documents.
2. As supplied by the Contractor, one of the following devices designed to accommodate a load at least 20% higher than the test load shown in the Plans or described herein for test loads:

- a. **Load Applied by Hydraulic Jack Acting Against Weighted Box or Platform:** Construct a test box or test platform, resting on a suitable support, over the pile, and load it with material with a total weight greater than the anticipated maximum test load. Locate supports for the weighted box or platform at least 6 feet or three pile/shaft diameters, whichever is greater, measured from the edge of the pile or shaft to the edge of the supports. Insert a hydraulic jack with pressure gauge between the test pile or shaft and the underside of the reaction beam, and apply the load to the pile or shaft by operating the jack between the reaction beam and the top of the pile or shaft.

- b. **Load Applied to the Test Pile or Shaft by Hydraulic Jack Acting Against Anchored Reaction Member:** Construct reaction member anchorages in accordance with article 6.3 of ASTM D1143. Attach a girder(s) of sufficient strength to act as a reaction beam to the upper ends of the anchor piles or shafts. Insert a hydraulic jack with pressure gauges between the head of the test pile/shaft and the underside of the reaction beam, and apply the test load to the pile/shaft by operating the jack between the reaction beam and the pile/shaft head.

If using drilled shafts with bells as reaction member anchorages, locate the top of the bell of any reaction shaft anchorage at least three shaft diameters below the bottom of the test shaft.

- c. **Combination Devices:** The Contractor may use a combination of devices (a) and (b), as described above, to apply the test load to the pile or shaft.

- d. **Other systems proposed by the Contractor and accepted by the Engineer:** When necessary, provide horizontal supports for loading the pile/shaft, and space them so that the ratio of the unsupported length to the minimum radius of gyration of the pile does not exceed 120 for steel piles, and the unsupported length to the least cross-section dimension does not exceed 20 for concrete piles or drilled shafts. Ensure that horizontal supports provide full support without restraining the vertical movement of the pile/shaft in any way.

When required by the Contract Documents, apply a horizontal load to the pile/shaft either separately or in conjunction with the vertical load. Apply the load to the test pile/shaft by hydraulic jacks, jacking against Contractor provided reaction devices. After receiving the Engineer's acceptance of the proposed method of load application, apply the horizontal load in increments, and relieve it in decrements as required by the Contract Documents.

**455-2.2.1 Modified Quick Test:**

1. **Loading Procedure:** Apply vertical loads concentric with the longitudinal axis of the tested pile/shaft to accurately determine and control the load acting on the pile/shaft at any time. Place the load on the pile/shaft continuously, in increments equal to approximately 5% of the maximum test load specified until approaching the failure load, as indicated by the measuring

apparatus and/or instruments. Then, apply increments of approximately 2.5% until the pile/shaft “plunges” or attains the limiting load. The Specialty Engineer may elect to stop the loading increments when the pile/shaft has met the failure criteria or when a settlement equal to 10% of the pile/shaft width or diameter is reached. Apply each load increment immediately after taking and verifying the complete set of readings from all gauges and instruments. Apply each increment of load within the minimum length of time practical, and immediately take the readings. Complete the addition of a load increment and the completion of the readings within 5 to 15 minutes. Hold the maximum applied load for one hour.

Remove the load in decrements of about 10% of the maximum test load. Remove each decrement of load within the minimum length of time practical, and immediately take the readings. Complete the removal of a load decrement and the taking of the readings within 5 to 15 minutes. The Engineer may also require up to two reloading cycles with five loading increments and three unloading decrements. Record the final recovery of the pile/shaft until movement is essentially complete for a period of one hour after the last unload interval.

2. Failure Criteria and Nominal Resistance: Use the criteria described herein to establish the failure load. The failure load is defined as the load that causes a pile/shaft top deflection equal to the calculated elastic compression plus 0.15 inches plus 1/120 of the pile/shaft minimum width or the diameter in inches for piles/shafts 24 inches or less in width, and equal to the calculated elastic compression plus 1/30 of the pile/shaft minimum width or diameter for piles/shafts greater than 24 inches in width. Consider the nominal resistance of any pile/shaft so tested as either the maximum applied load or the failure load, whichever is smaller.

**455-2.3 Measuring Apparatus:** Provide an apparatus for measuring movement of the test piles/shafts that consists of all of the following devices:

1. Wire Line and Scale: Stretch a wire between two secure supports located at a distance at least:
  - a. 10 feet from the center of the test pile but not less than 3.5 times the pile diameter or width.
  - b. 12 feet from the centerline of the shaft to be tested but not less than three shaft diameters.

Locate the wire supports as far as practical from reaction beam anchorages. At over-water test sites, the Contractor may attach the wire line to the sides of the service platform. Mount the wire with a pulley on one support and a weight at the end of the wire to provide constant tension on the wire. Ensure that the wire passes across the face of a scale mounted on a mirror attached to the test pile/shaft so that readings can be made directly from the scale. Use the scale readings as a check on an average of the dial readings. When measuring both horizontal and vertical movement, mount separate wires to indicate each movement, horizontal or vertical. Measure horizontal movements from two reference wires set normal to each other in a horizontal.

2. Wooden Reference Beams and Dial Gauges: Attach wooden reference beams as detailed in the Plans and accepted by the Engineer to independent supports. For piles, install the independent supports at the greater of 3.5 times the pile diameter or width or 10 feet from the centerline of the test pile. For drilled shafts, install independent supports at the greater of three shaft diameters or 12 feet from the centerline of the shaft to be tested. Locate the reference beam supports as far as practical from reaction beam anchorages. For over-water test sites, the Contractor may attach the reference beams between two diagonal platform supports. Attach dial gauges, with their stems resting either on the top of the pile/shaft or on lugs or similar reference

points on the pile/shaft, to the fixed beams to record the movement of the pile/shaft head. Ensure that the area on the pile/shaft or lug on which the stem bears is a smooth surface which will not cause irregularities in the dial readings.

Provide a minimum of four dial gauges, each with 0.001 inch divisions and with 2 inch minimum travel, placed at 90 degree intervals for measuring vertical or horizontal movement.

3. Survey Level: As a check on the dial gauges, determine the elevation of a point near the top of the test pile/shaft (on plan datum) by survey level at each load and unload interval during the load test. Unless accepted otherwise by the Engineer, level survey precision is 0.001 foot. Alternately, the surveyor may read an engineer's 50 scale attached near the pile/shaft head. Determine the first elevation before applying the first load increment; make intermediate readings immediately before a load increment or an unload decrement, and after the final unload decrement that completely removes the load. Make a final reading at the time of the last recovery reading.

For over-water test sites, when shown in the Plans or directed by the Engineer, the Contractor shall, drive an H pile through a 36 inch casing to provide a stable support for the level and to protect it against wave action interfering with level measurements. Provide a suitable movable jig for the surveyor to stand. Use a jig that has a minimum of three legs, has a work platform providing at least 4 feet width of work area around the casing, and is accepted by the Engineer before use. The described work platform may be supported by the protective casing when accepted by the Engineer.

#### **455-2.4 Load Test Instrumentation:**

1. General: The intent of the load test instrumentation is to measure the test load on top of the pile/shaft and its distribution between side friction and end bearing to provide evaluation of the preliminary design calculations and settlement estimates and to provide information for final pile/shaft length design. Ensure that the instrumentation is as described in the Contract Documents.

Supply 110 V, 60 Hz, 30 A of AC electric power in accordance with the National Electric Code (NEC) to each test pile/shaft site during the installation of the instrumentation, during the load testing, and during any instrumented set-checks/redrives.

Place all of the internal instrumentation on the rebar cage before installation in the test shaft. Construct the rebar cage at least two days before it is required for construction of the test shaft. Successfully demonstrate the lifting and handling procedures before installing the instrumentation. Place the instrumented rebar cage in one segment without causing damage to the instrumentation.

2. Hydraulic Jack and Load Cell: Provide hydraulic jack(s) of adequate size to deliver the required test load to the pile/shaft unless shown otherwise in the Plans. Before load testing begins, submit a certificate from a reputable testing laboratory showing a calibration of gauge readings for all stages of jack loading and unloading for jacks provided. Ensure that the jack has been calibrated within the preceding six months. Ensure that the accuracy of the gauge is within 5% of the true load.

Provide an adequate load cell accepted by the Engineer that has been calibrated within the preceding six months. Provide an approved electrical readout device for the load cell. Submit a certificate from an independent laboratory showing a calibration of readings for all stages of loading and unloading for load cells furnished by the Contractor and obtain the

approval of the Engineer before beginning load testing. Ensure that the accuracy of the load cell is within 1% of the true load.

3. Telltales: When shown in the Contract Documents, install telltales that consist of an unstressed steel rod, greased for reducing friction and corrosion, with appropriate clearance inside a constant-diameter pipe that rests on a flat plate attached to the end of the pipe at the point of interest shown in the Plans. Construct telltales in accordance with the Contract Documents. Install dial gauges reading to 0.001 inch with 1 inch minimum travel as directed by the Specialty Engineer to measure the movement of the telltale with respect to the top of the pile/shaft.

4. Embedded Strain Gauges: Install strain gauges in the test shaft to measure the distribution of the load. Ensure that the type, number, and location of the strain gauges are as shown in the Plans or as directed by the Geotechnical Foundation Design Engineer of Record (GFDEOR). Use strain gauges that are waterproof and have suitable shielded cable that is unspliced within the shaft. In drilled shafts provide sufficient instrumentation to determine side friction components in segments no longer than 5 feet and the end bearing component.

5. Caliper: Provide a caliper tool or system to measure accurately and continuously the shape of test shafts prior to placing concrete.

**455-2.5 Support Facilities:** Furnish adequate facilities for making load and settlement readings 24 hours per day. Provide such facilities for the instrumented area, and include lighting and shelter from rain, wind, and direct sunlight.

**455-2.6 Load Test Personnel Furnished by the Contractor:** Provide a certified welder, together with necessary cutting and welding equipment, to assist with the load test setup and to make any necessary adjustments during the load test. Provide personnel to operate the jack, generators, and lighting equipment, and also provide one person with transportation to assist as required during load test setup and conducting of the load tests. Provide qualified personnel, to read the dial gauges, take level measurements, and conduct the load test under the direct supervision of the Specialty Engineer.

**455-2.7 Cooperation by the Contractor:** Cooperate with the Department, and ensure that the Department has access to all facilities necessary for observation of the conduct and the results of the test.

**455-2.8 Required Reports:** Submit a static load test report signed and sealed by the Specialty Engineer to the Engineer for review and acceptance, at least three working days, excluding weekends and Department observed holidays, prior to beginning production pile/shaft construction. Include in the report of the load test the following information:

1. A tabulation of the time of, and the amount of, the load and settlement readings, and the load and recovery readings taken during the loading and unloading of the pile/shaft.

2. A graphic representation of the test results, during loading and unloading of pile/shaft top movement as measured by the average of the dial gauge readings, from wireline readings and from level readings.

3. A graphic representation of the test results, when using telltales, showing pile/shaft compression and pile/shaft tip movement.

4. The estimated failure and safe loads according to the criteria described herein.

5. The derived side friction component for each pile/shaft segment, and end bearing component. Include all pertinent test data, analysis and charts used to determine these values.

6. Remarks concerning any unusual occurrences during the loading of the pile/shaft.
7. The names of those making the required observations of the results of the load test, the weather conditions prevailing during the load test, and the effect of weather conditions on the load test.
8. All supporting data including jack and load cell calibrations and certificates and other equipment requiring calibration.
9. All data taken during the load test together with instrument calibration certifications. In addition, submit a report showing an analysis of the results of axial load and lateral load tests in which soil resistance along and against the pile/shaft is reported as a function of deflection.
10. For drilled shafts, include all cross-hole sonic logging results, gamma-gamma density logging results, the results of other integrity tests, caliper measurements data and the pilot holes reports of core borings. Attach this report to the final authorized tip elevations letter in accordance with 455-15.6.
11. For piles, include pile driving records, and dynamic testing data and analysis.
12. Submit a signed & sealed letter to the Department confirming the design assumptions were verified by the load tests before proceeding with production foundation construction.

**455-2.9 Disposition of Loading Material:** Remove all equipment and materials, which remains the Contractor's property, from the site. Clean up and restore the site to the satisfaction of the Engineer.

**455-2.10 Disposition of Tested Piles/Shafts:** After completing testing, cut off the tested piles/shafts, which are not to be incorporated into the final structure, and any reaction piles/shafts at an elevation 24 inches below the finished ground surface. Take ownership of the cut-offs and provide areas for their disposal.

## B. PILING

### **455-3 General.**

Furnish and install concrete, steel, or wood piling including driving, jetting, preformed pile holes, cutting off, splicing, dynamic load testing, and static load testing of piling. Prior to driving, clearly mark the piles to facilitate inspection. Provide individual straight-line marks at 1-ft intervals numbered at least every 5 ft. Use markers or lumber crayons or paint marks that can be easily observed by the inspector. Ensure marks are spaced uniformly and perpendicular to the face of the pile. Face pile so that the pile markings are easily visible to the pile inspector. Provide inch marks as needed when set checks or practical refusal checks are required.

In the event a pile is broken or otherwise damaged by the Contractor to the extent that the damage is irreparable, in the opinion of the Engineer, the Contractor shall extract and replace the pile at no additional expense to the Department. In the event that a pile is mislocated by the Contractor, the Contractor shall extract and replace the pile, at no expense to the Department, except when a design change proposed by the Contractor is approved by the Department as provided in 455-5.16.5.

**455-4 Classification.**

The Department classifies piling as follows:

1. Treated timber piling.
2. Prestressed concrete piling.
3. Steel piling.
4. Test piling.
5. Sheet piling.
  - a. Concrete sheet piling.
  - b. Steel sheet piling.
6. Polymeric Piles (see Section 471 for requirements).

**455-5 General Construction Requirements.**

**455-5.1 Predrilling of Pile Holes:** Predrilled pile holes are either starter holes to the depth described in this Subarticle or holes drilled through embankment/fill material down to the natural ground surface at no additional cost to the Department. When using low displacement steel piling such as structural shapes, drive them through the compacted fill without the necessity of drilling holes through the fill except when the requirements for predrilling are shown in the Plans. When using concrete or other high displacement piles, drill pile holes through fill, new or existing, to at least the elevation of the natural ground surface. Use the range of drill diameters listed below for square concrete piles.

12 inch square piles .....	15 to 17 inches
14 inch square piles .....	18 to 20 inches
18 inch square piles .....	22 to 26 inches
20 inch square piles .....	24 to 29 inches
24 inch square piles .....	30 to 34 inches
30 inch square piles .....	36 to 43 inches

For other pile sizes, use the diameter of the drills shown in the Plans or accepted by the Engineer. Accurately drill the pile holes with the hole centered over the Plan location of the piling. Maintain the location and vertical alignment within the tolerances allowed for the piling.

For predrilled holes required through rock or other hard (i.e. debris, obstructions, etc.) materials that may damage the pile during installation, predrill hole diameters approximately 2 inches larger than the largest dimension across the pile cross-section. Fill the annular space around the piles as described in 455-5.10.1 with clean A-3 sand or sand meeting the requirements of 902-3.3.

In the setting of permanent and test piling, the Contractor may initially predrill holes to a depth up to 10 feet or 20% of the pile length whichever is greater, unless otherwise shown in the plans. When installing piles in compacted fill, predrill the holes to the elevation of the natural ground surface. With prior written authorization from the Engineer, the Contractor may predrill holes to greater depths to minimize the effects of vibrations on existing structures adjacent to the work or for other reasons the Contractor proposes.

**455-5.2 Underwater Driving:** Underwater driving is defined as any driving through water which is above the pile head at the time of driving.

When conducting underwater driving, provide a diver equipped with voice communications to aid in placing the hammer back on the pile for required cushion changes or

for subsequent re-driving, to attach or recover instrumentation, to inspect the condition of the pile, or for other assistance as required.

Select one of the following methods for underwater driving:

1. Accomplish underwater driving using conventional driving equipment and piling longer than authorized so that the piling will extend above the water surface during final driving. When choosing this option, furnish a pile hammer that satisfies the requirements of this Section for use with the longer pile.

2. Accomplish underwater driving using an underwater hammer that meets the requirements of this Section and is accepted by the Engineer. When choosing this option, provide at least one pile longer than authorized at each pile group, extending above the water surface at final driving. At each group location, drive the longer pile first. Evaluate the adequacy of the underwater driving system. Use the pile tip elevation of the longer pile to evaluate the acceptability of the piles driven with the underwater hammer.

3. Accomplish underwater driving using conventional driving equipment with a suitable pile follower. When choosing this option, provide at least one pile longer than required at each pile group, extending above the water surface at final driving. At each group location, drive the full length pile first without using the follower. Perform a dynamic load test on the first pile driven with the follower in each group. Use the pile tip elevation of the longer pile to evaluate the acceptability of the piles driven with the follower.

Prior to use, submit details of the follower to the Engineer along with the information required in 455-10. Include the weight, cross-section details, stiffness, type of materials, and dimensions of the follower.

**455-5.3 Pile Hammers:** All equipment is subject to satisfactory field performance during and without dynamic testing. Use a variable energy hammer to drive concrete piles. Hammers will be rated based on the theoretical energy of the ram at impact. Supply driving equipment which provides the required resistance at a blow count ranging from 3 blows per inch (36 blows per foot) to 10 blows per inch (120 blows per foot) at the end of initial drive. When the stroke height or bounce chamber pressure readings do not adequately determine the energy of the hammer, provide and maintain a device to measure the velocity of the ram at impact. Determine the actual hammer energy in the field so that it is consistent with the hammer energy used for each bearing capacity determination. When requested, submit to the Engineer all technical specifications and operating instructions related to hammer equipment.

**455-5.3.1 Air/steam:** Variable energy air/steam hammers shall be capable of providing at least two ram stroke lengths. The short ram stroke length shall be approximately half of the full stroke for hammers with strokes up to 4 feet and no more than 2 feet for hammers with maximum strokes lengths over 4 feet. Operate and maintain air/steam hammers within the manufacturer's specified ranges. Use a plant and equipment for steam and air hammers with sufficient capacity to maintain, under working conditions, the hammer, volume and pressure specified by the manufacturer. Equip the plant and equipment with accurate pressure gauges which are easily accessible. Drive piles with air/steam hammers operating within 10% of the manufacturer's rated speed in blows per minute. Provide and maintain in working order for the Engineer's use an approved device to automatically determine and display the blows per minute of the hammer.

**455-5.3.2 Diesel:** Variable energy diesel hammers shall have at least three fuel settings that will produce reduced strokes. Operate and maintain diesel hammers within the manufacturer's specified ranges. Determine the rated energy of diesel hammers using measured



ram stroke length multiplied by the weight of the ram for open end hammers and by methods recommended by the manufacturer for closed end hammers.

Provide and maintain in working order an approved device to automatically determine and display ram stroke for open-end diesel hammers.

Equip closed-end (double acting) diesel hammers with a bounce chamber pressure gauge, in good working order, mounted near ground level so it can be easily read. Also, submit to the Engineer a chart, calibrated to actual hammer performance within 30 days prior to initial use, equating bounce chamber pressure to either equivalent energy or stroke for the closed-end diesel hammer to be used.

**455-5.3.3 Hydraulic:** Variable energy hydraulic hammers shall have at least three hydraulic control settings that provide for predictable energy or equivalent ram stroke. The shortest stroke shall be a maximum of 2 feet for the driving of concrete piles. The remaining strokes shall include full stroke and approximately halfway between minimum and maximum stroke.

Supply hammer instrumentation with electronic read out, and control unit that allows the inspector and Engineer to monitor, and the operator to read and adjust the hammer energy or equivalent ram stroke. When pressure measuring equipment is required to determine hammer energy, calibrate the pressure measuring equipment before use.

**455-5.3.4 Vibratory:** Vibratory hammers of sufficient capacity (force and amplitude) may be used to drive steel sheet piles and, with acceptance of the Engineer, to drive steel bearing piles a sufficient distance to get the impact hammer on the pile (to stick the pile). The Geotechnical Foundation Design Engineer of Record will determine the allowable depth of driving using the vibratory hammer based on site conditions. However, in all cases, use a power impact hammer for the last 15 feet or more of the final driving of steel bearing piles for bearing determinations after all piles in the bent/pier have been driven with a vibratory hammer. Do not use vibratory hammers to install concrete piles, or to install support or reaction piles for a load test.

#### **455-5.4 Cushions and Pile Helmet:**

**455-5.4.1 Capblock:** Provide a capblock (also called the hammer cushion) as recommended by the hammer manufacturer. Use commercially manufactured capblocks constructed of durable manmade materials with uniform known properties. Do not use wood chips, wood blocks, rope, or other material which permit excessive loss of hammer energy. Do not use capblocks constructed of asbestos materials. Obtain the Engineer's acceptance for all proposed capblock materials and proposed thickness for use. Maintain capblocks in good condition, and replace them when charred, melted, or otherwise significantly deteriorated. Inspect the capblock before driving begins and weekly or at appropriate intervals based on field trial. Replace or repair any capblock which loses more than 25% of its original thickness, in accordance with the manufacturer's instructions, before permitting further driving.

**455-5.4.2 Pile Cushion:** Provide a pile cushion that is adequate to protect the pile from being overstressed in compression and tension during driving. Use a pile cushion sized so that it will fully fill the lateral dimensions of the pile helmet minus one inch but does not cover any void or hole extending through the top of the pile. Determine the thickness based upon the hammer-pile-soil system. For driving concrete piles, use a pile cushion made from pine plywood or oak lumber. Do not use materials previously soaked, saturated or treated with oil. Maintain pile cushions in good condition and replace them when charred, splintered, excessively compressed, or otherwise deteriorated to the point it will not protect the pile against

overstressing in tension or compression. Protect cushions from the weather, and keep them dry. Do not soak the cushions in any liquid. Provide a new cushion for each pile unless approved otherwise by the Engineer after satisfactory field trial during dynamic testing.

During dynamic load tests, replace the pile cushion when any of the pile stress measurements exceed the maximum allowed pile stress determined by 455-5.12.2. When driving a pile without dynamic testing, replace the pile cushion when the cushion is either compressed more than one-half the original thickness, begins to burn, or as directed by the Engineer after field performance.

Reuse pile cushions in good condition to perform all set-checks and redrives. Use the same cushion to perform the set-check or redrive as was used during the initial driving, unless this cushion is unacceptable due to deterioration, in which case use a similar cushion.

**455-5.4.3 Pile Helmet:** Provide a pile helmet suitable for the type and size of piling being driven. Use a pile helmet deep enough to adequately contain the required thickness of pile cushion and to assist in maintaining pile-hammer alignment. Use a pile helmet that fits loosely over the pile head and is at least 1 inch larger than the pile dimensions. Use a pile helmet designed so that it will not restrain the pile from rotating.

**455-5.5 Leads:** Provide pile leads constructed in a manner which offers freedom of movement to the hammer and that have the strength and rigidity to hold the hammer and pile in the correct position and alignment during driving. When using followers, use leads that are long enough and suitable to maintain position and alignment of the hammer, follower, and pile throughout driving.

**455-5.6 Followers:** When driving using followers, perform dynamic load testing as per 455-5.14. Obtain the Engineer's acceptance for the type of follower, when used, and the method of connection to the leads and pile. Use followers constructed of steel with an adequate cross-section to withstand driving stresses. When driving concrete piles, ensure that the cross-sectional area of the follower is at least 18% of the cross-sectional area of the pile. When driving steel piles, ensure that the cross-sectional area of the follower is greater than or equal to the cross-sectional area of the pile. Provide a pile helmet at the lower end of the follower sized according to the requirements of 455-5.4.3. Use followers constructed that maintain the alignment of the pile, follower, and hammer and still allow the pile to be driven within the allowable tolerances. Use followers designed with guides adapted to the leads that maintain the hammer, follower, and the piles in alignment.

Use information from dynamic load tests described in 455-5.14 to evaluate the adequacy of the follower and to determine pile capacity.

**455-5.7 Templates and Ground Elevations:** Provide a fixed template, adequate to maintain the pile in proper position and alignment during driving with swinging leads or with semi-fixed leads. The Engineer may allow the use of templates attached to a barge if the Contractor demonstrates satisfactorily that the pile alignment, and the elevation and horizontal position of the template can be maintained during all pile driving operations. Where practical, place the template so that the pile can be driven to cut-off elevation before removing the template. Ensure that templates do not restrict the vertical movement of the pile.

Supply a stable reference close to the pile, which is satisfactory in the opinion of the Engineer, for determination of the pile penetration. At the time of driving piles, obtain and record elevations of the original ground and template at each pile or pile group location. Note the highest and lowest elevation at each required location and the ground elevation at all piles.

**455-5.8 Water Jets:** Use jet pumps, supply lines, and jet pipes that provide adequate pressure and volume of water to freely erode the soil. Do not perform jetting without prior approval by the Engineer.

Do not perform jetting in the embankment or for end bents. Where conditions warrant, with approval by the GFDEOR, perform jetting on the holes first, place the pile therein, then drive the pile to secure the last few feet of penetration. Only use one jet for prejetting or jetting through piles constructed with a center jet-hole. Use two jets when using external jets. When jetting and driving, position the jets slightly behind the advancing pile tip (approximately 3 feet or as approved by the GFDEOR. When using water jets in the driving, determine the pile bearing only from the results of driving after withdrawing the jets, except where using jets to continuously eliminate soil resistance through the scour zone, ensure that they remain in place as directed by the GFDEOR and operating during pile bearing determination. Where practical, perform jetting on all piles in a pile group before driving begins. When large pile groups or pile spacing and batter make this impractical, or when the Plans specify a jet-drive sequence, set check a sufficient number of previously driven piles in a pile group to confirm their capacity after completing all jetting.

**455-5.9 Penetration Requirements:** Measure the penetration of piles from the elevation of natural ground, the deepest scour elevation shown in the Pile Data Table, or the bottom of excavation, whichever is lower. When the Contract Documents show a minimum pile tip elevation, drive the tip of the pile to this minimum elevation. The Engineer will accept the bearing of a pile only if the Contractor achieves the required bearing when the tip of the pile is at or below the specified minimum tip elevation and below the bottom of the preformed or predrilled pile hole.

When the Plans do not show a minimum tip elevation, ensure that the penetration is at least 10 feet into firm bearing material or at least 20 feet into soft material unless otherwise permitted by the Engineer. The Engineer may accept a penetration between 15 feet and 20 feet when there is an accumulation of five consecutive feet or more of firm bearing material. Firm bearing material is any material offering a driving resistance greater than or equal to 30 tons per square foot of gross pile area as determined by the Dynamic Load Testing (455-5.12.4). Soft material is any material offering less than these resistances. The gross pile area is the actual pile tip cross-sectional area for solid concrete piles, the product of the width and depth for H piles, and the area within the outside perimeter for pipe piles and voided concrete piles.

Do not drive piles beyond practical refusal. To meet the requirements in this Subarticle, provide penetration aids, such as jetting or preformed pile holes, when piles cannot be driven to the required penetration without reaching practical refusal.

**455-5.10 Preformed Pile Holes:**

**455-5.10.1 Description:** Preformed pile holes serve as a penetration aid when all other pile installation methods fail to produce the desired penetration and when authorized by the GFDEOR to minimize the effects of vibrations on adjacent structures. Preformed pile holes are necessary when the presence of rock or strong strata of soils will not permit the installation of piles to the desired penetration by driving or a combination of jetting and driving, when determined necessary, and authorized by the GFDEOR to minimize the effects of vibrations on adjacent existing structures. Drive all piles installed in preformed pile holes to determine that the bearing requirements have been met.

For preformed holes which are required through material that caves during driving to the extent that the preformed hole does not serve its intended purpose, case the hole

from the surface through caving material. After installing the pile to the bottom of the casing, remove the casings unless shown otherwise in the Plans. Determine bearing of the pile after removing the casing unless shown otherwise in the Plans. Fill all voids between the pile and soil remaining after driving through preformed holes with clean A-3 sand or sand meeting the requirements of 902-3.3, after the pile has achieved the required minimum tip elevation, unless grouting of preformed pile holes is shown in the Plans. If pile driving is interrupted during sand placement, drive the pile at least 20 additional blows after filling all of the voids between the pile and soil with sand at no additional cost to the Department.

**455-5.10.2 Provisions for Use of Preformed Pile Holes:** Preformed pile holes may be used when the Contractor establishes that the required results cannot be obtained when driving the load bearing piles with specified driving equipment, or if jetting is allowed, while jetting the piles and then driving or while jetting the piles during driving.

**455-5.10.3 Reasons for Preformed Pile Holes:** The Department considers, but does not limit to, the following conditions as reasons for preformed pile holes:

1. Inability to drive piles to the required penetration with driving and jetting equipment.
2. To penetrate a hard layer or layers of rock or strong stratum that the Engineer considers not sufficiently thick to support the structure.
3. To obtain greater penetration into dense (strong) material and into dense material containing holes, cavities or unstable soft layers.
4. To obtain penetration into a stratum in which it is desired to found the structure.
5. To minimize the effects of vibrations or heave on adjacent existing structures.
6. To minimize the effects of ground heave on adjacent piles.

**455-5.10.4 Construction Methods:** Construct preformed pile holes by drilling, or driving and withdrawing a suitable punch or chisel at the locations of the piles. Construct a hole that is equal to or slightly greater than the largest pile dimension for the entire length of the hole and of sufficient depth to obtain the required penetration. Carefully form the preformed hole by using a drill or punch guided by a template or other suitable device, and do not exceed the minimum dimensions necessary to achieve the required penetration of the pile. When the Plans call for grouting the preformed pile holes, provide a minimum pile hole dimension that is 2 inches larger than the largest pile dimension. Construct the holes at the Plan position of the pile and the tolerances in location, and ensure the hole is straight and that the batter is the same as specified for the pile. Loose material may remain in the preformed pile hole if the conditions in 455-5.10.1 are satisfied.

**455-5.10.5 Grouting of Pile Holes:** Clean and grout preformed pile holes for bearing piles, when the Plans require grouting after driving. Use grout that meets the requirements of 455-40 and 455-42 and has a minimum compressive strength of 3,000 psi at 28 days or as specified in the Plans. Prepare cylinders and perform QC testing in accordance with 455-43. LOT size and verification will be in accordance with 455-43. Pump the grout through three or more grout pipes initially placed at the bottom of the preformed hole. The Contractor may raise the grout pipes when necessary to prevent clogging and to complete the grouting operations. Maintain the grout pipes below the surface of the previously placed grout. Continue grouting until the grout reaches the ground surface all around the pile. Provide divers to

monitor grouting operations when the water depth is such that it is impractical to monitor from the ground surface.

**455-5.11 Bearing Requirements:**

**455-5.11.1 General:** Drive piles to provide the bearing required for carrying the loads shown in the Plans. For all types of bearing piles, consider the driving resistance as determined by the methods described herein sufficient for carrying the specified loads as the minimum bearing which is accepted for any type of piles. Determine pile bearing using the method described herein or as shown in the Plans.

For foundations requiring 100% dynamic testing of production piles, ensure each pile has achieved minimum penetration and the minimum required bearing for 6 inches of consecutive driving, or the minimum penetration is achieved, driving has reached practical refusal in firm material and the bearing capacity obtained in all the refusal blows.

For foundations not requiring 100% dynamic testing of production piles, ensure each pile has achieved minimum penetration, the blow count is generally the same or increasing and the minimum required bearing capacity obtained for 24 inches of consecutive driving with less than 1/4 inches rebound per blow, or the minimum penetration is achieved and driving has reached practical refusal in firm material.

**455-5.11.2 Bearing Criteria:** For foundations requiring 100% dynamic testing, determine the bearing of all piles using the data received from dynamic load testing equipment utilizing internally or externally mounted sensors according to the methods described in 455-5.12.1.

For foundations not requiring 100% dynamic testing, drive all piles to the blow count criteria established by the GFDEOR and the Dynamic Testing Engineer (DTE) using the methods described herein and presented in the production pile length and driving criteria letter (see 455-5.15.2).

**455-5.11.3 Practical Refusal:** Practical refusal is defined as 20 blows per inch or less than one inch penetration, with the hammer operating at the highest setting or setting determined by the DTE for driving piles without damage and less than 1/4 inches rebound per blow. Stop driving as soon as the pile has reached practical refusal.

**455-5.11.4 Set-checks and Pile Redrive:**

1. Set-checks: Set-checks consist of re-driving the pile after certain period of time, typically up to 24 hours. Perform set-checks as required and at the waiting periods shown in the Contract Documents. Provide an engineer's level or other suitable equipment for elevation determinations to determine accurate pile penetration during the set-checks. A pile may be accepted when a set-check shows that it has achieved the minimum required pile bearing and has met all other requirements of this Section.

2. Pile Redrive: Pile redrive consists of re-driving the pile after the following working day from initial driving to determine time effects, to reestablish pile capacity due to pile heave, or for other reasons.

3. Uninstrumented Set-Checks and Uninstrumented Pile Redrive: Piles may be accepted based on uninstrumented set-checks or uninstrumented pile redrives only when the piles are redriven for at least 24 inches. In these cases, the piles may be considered to have sufficient bearing resistance when the specified blow count criteria is achieved in accordance with 455-5.11.1 and 455-5.11.2. Unless practical refusal is obtained as defined in 455-5.11.3, set-checks or redrives for piles redriven less than 24 inches must be instrumented for pile acceptance.

4. Instrumented Set-Checks and Instrumented Pile Redrive: Use dynamic load tests using at least 6 hammer blows to determine whether the pile bearing is sufficient. The pile may be considered to have sufficient bearing resistance when dynamic measurements demonstrate the static pile resistance exceeds the required pile resistance for at least one hammer blow and the average static pile resistance during the next five hammer blows exceeds 95% of the required pile resistance. If the pile is advanced farther, the static pile resistance during all subsequent blows must exceed 90% of the required pile resistance.

**455-5.11.5 Pile Heave:** Pile heave is the upward movement of a pile from its originally driven elevation. Drive the piles in an appropriate sequence to minimize the effects of heave and lateral displacement of the ground. Monitor piles previously driven in a pile group for possible heave during the driving of the remaining piles. Take elevation measurements to determine the magnitude of the movement of piles and the ground surface resulting from the driving process. Redrive all piles that have heaved 1/4 inches or more.

**455-5.11.6 Piles with Insufficient Bearing:** When the bearing capacity of any pile is less than the required bearing capacity, the Contractor may splice the pile and continue driving or may extract the pile and drive a pile of greater length, or drive additional piles.

**455-5.11.7 Optional Soil Set-up approach:** If the Contractor so desires, it may consider soil set-up. Production piles that are driven to less than the Nominal Bearing Resistance (NBR) may be accepted based on the anticipated soil setup without set checks on all piles, only if the following criteria are met:

- (a) Pile tip penetration satisfies the minimum penetration requirement following 455-5.9.
- (b) End of Initial Drive (EOID) resistance exceeds 1.10 times the Factored Design Load for the pile bent/pier, as determined by the dynamic testing or blow count criteria.
- (c) The Resistance Factor for computing NBR is taken from the following table:

Resistance Factors for Pile Installation Using Soil Setup (all structures)				
Loading	Design Method	Construction QC Method	Resistance Factor, $\phi$	
			Blow Count Criteria <sup>4</sup>	100% Dynamic Testing <sup>5</sup>
Compression	Davisson Capacity	EDC <sup>1</sup> , or PDA and CAPWAP <sup>2</sup>	0.55	0.60
		Static Load Testing <sup>3</sup>	0.65	0.70
		Statnamic Load Testing <sup>3</sup>	0.60	0.65
Uplift	Skin Friction	EDC <sup>1</sup> , or PDA and CAPWAP <sup>2</sup>	0.45	0.50
		Static Load Testing <sup>3</sup>	0.55	0.55

1 Using the analysis methods published by Tran et al (2012)  
2. Dynamic Load Testing and Signal Matching Analysis  
3 Used to confirm the results of Dynamic Load Testing and Signal Matching Analysis  
4 Initial drive of production piles using Blow Count Criteria  
5 Initial drive of all piles accepted by results of Dynamic Testing of all blows.

(d) At least one test pile is driven at each bent/pier with a successful set check at the anticipated production pile tip elevations and one of the following sets of dynamic load testing conditions are met at each bent/pier.

1. The bearing of at least 10% of piles in the bent/pier (round up to the next whole number) is confirmed by instrumented set-check, and all test piles and instrumented set-checks demonstrate the pile resistance exceeds the NBR within seven days after EOID

2. The bearing of at least 20% of piles in the bent/pier (round up to the next whole number) is confirmed by instrumented set-check, and all test piles and instrumented set-checks demonstrate the pile resistance exceeds the NBR within 21 days after EOID.

(e) All uninstrumented piles are driven deeper and to a greater EOID resistance than the EOID resistance of all instrumented production piles in the same bent/pier.

#### **455-5.12 Methods to Determine Pile Capacity:**

**455-5.12.1 General:** Dynamic load tests using an externally mounted instrument system and signal matching analyses or embedded gauges will determine pile capacity for all structures or projects unless otherwise shown on the Plans. Notify the Engineer two working days prior to placement of piles within the template and at least one working day prior to driving piles.

#### **455-5.12.2 Wave Equation:**

1. General: Use Wave Equation Analysis for Piles (WEAP) programs to evaluate the suitability of the proposed driving system (including the hammer, follower, capblock and pile cushions) as well as to estimate the driving resistance, in blows per 12 inches or blows per inch, to achieve the pile bearing requirements and to evaluate pile driving stresses.

Use Wave Equation Analyses to show the hammer meets the requirements described in 455-5.3.

2. Required Equipment For Driving: Hammer acceptance is solely based on satisfactory field trial including dynamic load test results and Wave Equation Analysis. Supply a hammer system that meets the requirements described in the specifications based on satisfactory field performance.

In the event piles require different hammer sizes, the Contractor may elect to drive with more than one size hammer or with a variable energy hammer, provided the hammer is properly sized and cushioned, will not damage the pile, and will develop the required resistance.

#### **3. Maximum Allowed Pile Stresses:**

a. General: The maximum allowed driving stresses for concrete, steel, and timber piles are given below. In the event dynamic load tests show that the hammer will overstress the pile, modify the driving system or method of operation as required to prevent overstressing the pile. In such cases provide additional cushioning, reduce the stroke, or make other appropriate agreed upon changes.

b. Prestressed Concrete Piles: Use the following equations to determine the maximum allowed pile stresses:

$$s_{apc} = 0.7 f'_c - 0.75 f_{cpe} \quad (1)$$

$$s_{apt} = 6.5 (f'_c)^{0.5} + 1.05 f_{cpe} \quad (2a) \text{ for piles less than 50 feet long}$$

$$s_{apt} = 3.25 (f'_c)^{0.5} + 1.05 f_{cpe} \quad (2b) \text{ for piles 50 feet long and greater}$$

$$s_{apt} = 500 \quad (2c) \text{ within 20 feet of a mechanical splice}$$

where:

$s_{apc}$  = maximum allowed pile compressive stress, psi

$s_{apt}$  = maximum allowed pile tensile stress, psi

$f'_c$  = specified minimum compressive strength of concrete, psi

$f_{cpe}$  = effective prestress (after all losses) at the time of driving, psi, taken as 0.8 times the initial prestress force divided by the minimum net concrete cross sectional area of the pile ( $f_{cpe} = 0$  for dowel spliced piles).

c. Steel Piles: Ensure the maximum pile compression and tensile stresses measured during driving are no greater than 0.9 times the yield strength ( $0.9 f_y$ ) of the steel.

d. Timber Piles: Ensure the maximum pile compression and tensile stresses measured during driving are no greater than 3.6 ksi for Southern Pine and Pacific Coast Douglas Fir and 0.9 of the ultimate parallel to the grain strength for piles of other wood.

**455-5.12.3 Temporary Piles:** Submit for the Engineers review, an analysis signed and sealed by the GFDEOR which establishes the pile lengths for temporary piles. Submit for the Engineer's acceptance, a Wave Equation analysis signed and sealed by the GFDEOR which establishes the driving criteria for temporary piles at least five working days prior to driving temporary production piles. The required driving resistance is equal to the sum of the factored design load plus the scour and down drag resistances shown in the Plans, divided by the appropriate resistance factor or the nominal bearing resistance shown in the Plans, whichever is higher:

The maximum resistance factor is 0.45 when only wave equation analysis is performed. However, a larger resistance factor may be applicable when additional testing is provided by the GFDEOR in accordance with Section 3.5.6 of Volume 1 of the FDOT Structures Manual.

**455-5.12.4 Dynamic Load Tests:** Dynamic load testing consists of estimating pile capacity by the analysis of electronic data collected from blows of the hammer during driving of an instrumented pile in accordance with 455-5.14.

**455-5.12.5 Static Load Tests:** Static load testing consists of applying a static load to the pile to determine its capacity. Use the Modified Quick Test Procedure in accordance with 455-2.2.1.

**455-5.12.6 Fender Pile Installation:** For piles used in fender systems, regardless of type or size of pile, either drive them full length or jet the piles to within 2 feet of cutoff and drive to cutoff elevation to seat the pile. The Engineer will not require a specific driving resistance unless noted in the Plans. Use methods and equipment for installation that do not damage the piles. If the method or equipment used causes damage to the pile, modify the methods or equipment.

**455-5.12.7 Structures Without Test Piles:** For structures without 100% dynamic testing or test piles, dynamically test the first pile(s) in each bent or pier at locations shown in the



Plans to determine the blow count criteria for the remaining piles. Dynamically test at least 5% of the piles at each bent or pier (rounded up to the next whole number).

**455-5.13 Test Piles:**

**455-5.13.1 General:** All test piles will have dynamic load tests. Drive piles of the same cross-section and type as the permanent piles shown in the Plans, in order to determine any or all of the following:

1. installation criteria for the piles.
2. nature of the soil.
3. lengths of permanent piles required for the work.
4. driving resistance characteristics of the various soil strata.
5. amount of work necessary to obtain minimum required pile penetration.
6. the ability of the driving system to do the work.
7. the need for point protection.
8. Verify the bearing stratum is of sufficient thickness to prevent punching

shear failure.

Because test piles are exploratory in nature, drive them harder (within the limits of practical refusal), deeper, and to a greater bearing resistance than required for the permanent piling. Except for test piles which are to be statically or Statnamically load tested, drive test piles their full length or to practical refusal. Splice test piles which have been driven their full length and have developed only minimal required bearing, and proceed with further driving.

As a minimum, unless otherwise accepted by the Engineer, do not cease driving of test piles until obtaining the required bearing capacity continuously, where the blow count is increasing, for 10 feet unless reaching practical refusal first. For test piles which are to be statically or Statnamically load tested, ignore this minimum and drive these piles as anticipated for the production piles.

When test piles attain practical refusal prior to attaining minimum penetration, perform all work necessary to attain minimum penetration and the required bearing. Where practical, use water jets to break the pile loose for further driving. Where jetting is impractical, extract the pile and install a preformed pile hole through which driving will continue. Install instruments on all test piles.

**455-5.13.2 Location of Test Piles:** Drive all test piles in the position of permanent piles at the designated locations. Ensure that all test piles designated to be statically load tested are plumb. In the event that all the piles are battered at a static load test site, an out-of-position location for driving a plumb pile for the static load test may be selected.

**455-5.13.3 Equipment for Driving:** Use the same hammer and equipment for driving test piles as for driving the permanent piles. Also use the same equipment to redrive piles.

**455-5.14 Dynamic Load Tests:** Take dynamic measurements during the driving of piles designated in the Plans. Provide all personnel, materials and equipment for dynamic testing. For concrete piles, install instruments prior to driving and monitor all blows delivered to the pile. For steel production piles, the Engineer may accept instrumented set checks or redrives. Perform dynamic load tests to evaluate the following:

1. Suitability of the driving equipment, including hammer, capblock, pile cushion, and any proposed follower.
2. Pile capacity.

3. Pile stresses.
4. Energy transfer to pile.
5. Distribution of soil resistance.
6. Soil variables including quake and damping.
7. Hammer-pile-soil system for Wave Equation analyses.
8. Pile installation problems.

Either install embedded gauges in the piles in accordance with Standard Plans, Index 455-003, or attach instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing.

Monitor the stresses in the piles with the dynamic test equipment during driving to ensure the maximum allowed stresses are not exceeded. If necessary, add additional cushioning, replace the cushions, or reduce the hammer stroke to maintain stresses below the maximum allowable. If dynamic test equipment measurements indicate non-axial driving, immediately realign the driving system. If the cushion is compressed to the point that a change in alignment of the hammer will not correct the problem, add cushioning or change the cushion.

Drive the pile to the required penetration and resistance.

Do not use a cold diesel hammer for a set-check. Generally, warm up the hammer by driving another pile or applying at least 20 blows to a previously driven pile or to timber mats placed on the ground.

#### **455-5.15 Pile Lengths:**

**455-5.15.1 Test Pile Length:** Provide the length of test piles shown in the Plans or as directed by the GFDEOR.

#### **455-5.15.2 Production Pile Length**

The production pile lengths shall be the lengths determined by the DTE and the GFDEOR based on all information available before the driving of the permanent piles, including, but not limited to, information gained from the driving of test piles, dynamic load testing, static load testing, supplemental soil testing, etc. When authorized by the Department, soil freeze information obtained during set checks and pile redrives may be used to determine authorized pile lengths for sites with extreme soil conditions.

After completion of the test pile program, production pile lengths and driving criteria shall be established in a letter signed and sealed jointly by the DTE and the GFDEOR. The letter will contain an itemized list of authorized pile lengths as well as the blow count criteria for acceptance of the pile, minimum penetrations, maximum strokes, criteria to replace cushions and any other conditions and limitations deemed appropriate for the safe installation of the piles. Use these lengths for furnishing the permanent piling for the structure. At least two working days, excluding weekends and Department observed holidays, prior to beginning of production pile driving, submit the letter and load test reports to the Engineer including the following electronic files (Windows compatible): dynamic testing data, signal matching data and results, and Wave Equation data and results.

If there are no test piles, provide the Production Pile Order Lengths in the Pile Data Table on the Structure Plans.

#### **455-5.16 Allowable Driving Tolerances:**

**455-5.16.1 General:** Meet the tolerances described in this Subarticle for the piles that are free standing without lateral restraint (after the template is removed). After the piles are driven, do not move the piles laterally to force them to be within the specified tolerances, except to move battered piles laterally to overcome the dead load deflections caused by the pile's

weight. When this is necessary, submit calculations signed and sealed by a Specialty Engineer to the Engineer that verify the amount of dead load deflection prior to moving any piles.

**455-5.16.2 Position:** Ensure that the final position of the pile head at cut-off elevation is no more than 3 inches, or 1/6 of the diameter of the pile, whichever is less, laterally in the X or Y coordinate from the Plan position indicated in the Plans.

**455-5.16.3 Axial Alignment:** Ensure that the axial alignment of the driven piles does not deviate by more than 1/4 inches per foot from the vertical or batter line indicated in the Plans.

**455-5.16.4 Elevation:** Ensure that the final elevation of the pile head is no more than 1-1/2 inches above, or more than 4 inches below, the elevation shown in the Plans, however in no case shall the pile be embedded less than 8 inches into the cap or footing.

For fender piles, cut off piles at the elevation shown in the Plans to a tolerance of plus 0.0 inches to minus 2.0 inches using sawing or other means as accepted by the Engineer to provide a smooth level cut.

**455-5.16.5 Deviation from Above Tolerances:** Have the Contractor's Engineer of Record perform an evaluation of the as built foundation to determine whether a foundation redesign or an increase in the loading requirements of the piles is needed. Include the signed and sealed evaluation as part of the certification package submitted in accordance with 455-5.19. If the evaluation indicates the foundation or the pile load requirements must be modified, propose a redesign to incorporate out of tolerance piles into pile caps or footings, at no expense to the Department. Submit signed and sealed redesign drawings and computations to the Engineer for review and acceptance. Do not begin any proposed construction until the redesign has been reviewed and accepted by the Engineer, excepted as noted in 455-5.20.

**455-5.17 Disposition of Pile Cut-offs, Test Piles, and Load Test Materials:**

**455-5.17.1 Pile Cut-offs:**

Take ownership of any unused cut-off lengths remaining, and remove them from the right-of-way. Provide areas for their disposal.

**455-5.17.2 Test Piles:** Cut off, or build-up as necessary, test piles, and leave them in place as permanent piles. Extract and replace test piles driven in permanent position and found not suitable for use. Pull, or cut off at an elevation 2 feet below the ground surface or bottom of proposed excavation, test piles driven out of permanent position, and dispose of the removed portion of the test pile.

When test piles are required to be driven in permanent pile positions, the Contractor may elect to drive the test pile out of position provided that a replacement pile is furnished and driven in the position that was to be occupied by the test pile. Unless otherwise directed in the Plans or by the Engineer, retain ownership of test piles that are pulled or cut off and provide areas for their disposal.

**455-5.18 Recording:** Inspect and record all the pile installation activities, including but not limited to handling, jetting, predrilling, preforming and driving on the Department's Pile Driving Record form. Steel piles and dynamically tested concrete piles in accordance with 455-5.14 will not require inspection during handling. Keep a pile driving log for each pile installed whether it is, or is not, instrumented. Within one working day after completing the installation of a pile, submit the Pile Driving Record to the Engineer.

**455-5.19 Foundation Certification Packages:** Submit certification packages of pile foundations to the Engineer prior to Pile Verification Testing. A separate Foundation Certification Package must be submitted for each foundation unit. A foundation unit is defined as

all the piles within one bent or pier for a specific bridge for each phase of construction. Each Foundation Certification Package shall contain an original certification letter signed and sealed by the GFDEOR certifying the piles have the required axial capacity including compression and uplift, lateral stability, pile integrity, settlements will not affect the functionality of the structure, and that the inspection of the pile installation was performed under the supervision of the GFDEOR. The package shall also include all pile driving logs, EDC records, all supplemental dynamic testing raw data and analyses for the foundation unit, and the signed and sealed evaluation performed to address out of tolerance piles in accordance with 455-5.16.5. The certification shall not be contingent on any future testing or approval by Engineer.

For foundation units where all piles are dynamically load tested by the same DTE, the foundation certification package may be prepared by the DTE, and the DTE may sign and seal the foundation layout and pile data table to reflect as-built conditions if the DTE is prequalified under the appropriate category in Florida Administrative Code (F.A.C.) 14-75.

**455-5.20 Verification:** One working day, excluding weekends and Department observed holidays, after receipt of the Foundation Certification Package, the Engineer will determine whether a pile in that foundation unit will be selected for verification testing. Based on its review of the certification package, the Engineer may or may not choose a pile for verification testing in any or all foundation units. For the pile selected by the Engineer for verification testing, the Engineer will provide the dynamic load test equipment and personnel for the Pile Verification Testing. Provide the driving equipment and pile driving crew for the Pile Verification Testing and provide support as needed to prepare the piles for testing. The Engineer will provide the results of the verification testing and identify additional needs for verification testing within one working day of testing.

If the capacity or integrity of any pile is found to be deficient, the Engineer will reject the entire certification package for the foundation unit, and the Contractor shall:

1. Correct the deficiency;
2. Correct the process that led to the deficiency;
3. Demonstrate to the Engineer that the remainder of the piles in the foundation unit are acceptable, including additional dynamic load tests to verify pile capacity and integrity, and;
4. Recertify the foundation unit.

One working day, excluding weekends and Department observed holidays, after receipt of the recertification, the Engineer shall then determine whether additional verification testing is required in that foundation unit. If the capacity or integrity of a verification pile is found to be deficient, additional cycles of deficiency correction and verification testing shall be completed until no more pile capacity or integrity deficiencies are detected or the design is modified accordingly. Piles shall not be cut-off nor bent/pier caps placed prior to successful completion of the Pile Verification Testing Program for that foundation unit. In case of disagreement of dynamic testing results, the Engineer's results will be final and will be used for acceptance.

On land foundation units or water foundation units when the pile cutoff is at least six feet above mean high water, the Contractor may cut-off piles prior to a complete submittal of the Certification Package or to a successful completion of the Pile Verification Testing Program at its own risk. If any piles in a foundation unit are cut-off prior to the submittal of a certification package or completion of the Pile Verification Testing Program and the Engineer determines that verification testing is required, the Contractor shall perform, at no expense to the Department,

any work and labor required to expose any pile selected for verification to allow the installation of the instruments in dry conditions and to provide references and access to the Engineer for such testing. Piles experiencing damage during the verification testing or requiring build-up after the verification shall be repaired by the Contractor at no expense to the Department. No pile bent/cap shall be poured prior to successful completion of the Pile Verification Testing Program for that foundation unit or notification by the Engineer that no verification will be required.

#### **455-6 Timber Piling.**

**455-6.1 Description:** Drive timber piles of the kind and dimensions specified in the Plans at the locations and to the elevations shown in the Plans.

**455-6.2 Materials:** Meet the timber piling requirements of Section 953. Treat the piles according to the applicable provisions of Section 955. Treat all cuts and drilled holes in accordance with 470-3.

#### **455-6.3 Preparation for Driving:**

**455-6.3.1 Caps:** Protect the heads of timber piles during driving, using a cap of approved type, that will distribute the hammer blow over the entire cross-section of the pile. When necessary, cut the head of the pile square before beginning pile driving.

**455-6.3.2 Collars:** Provide collars or bands to protect piles against splitting and brooming at no expense to the Department.

**455-6.3.3 Shoes:** Provide piles shod with metal shoes, of a design satisfactory to the Engineer, at no expense to the Department. Shape pile tips to receive the shoe and install according to the manufacturer's directions.

**455-6.4 Storage and Handling:** Store and handle piles in the manner necessary to avoid damage to the piling. Take special care to avoid breaking the surface of treated piles. Do not use cant dogs, hooks, or pike poles when handling and storing the piling.

**455-6.5 Cutting Off:** Saw off the tops of all timber piles at the elevation indicated in the Plans. Saw off piles which support timber caps to the exact plane of the superimposed structure so that they exactly fit. Withdraw and replace broken, split, or misplaced piles.

**455-6.6 Build-ups:** The Engineer will not permit splices or build-ups for timber piles. Extract piles driven below Plan elevation and drive a longer pile.

#### **455-6.7 Pile Heads:**

**455-6.7.1 Piles with Timber Caps:** On piles wider than the timber caps, dress off the part of the pile head projecting beyond the sides of the cap to a slope of 45 degrees. Coat the cut surface with the required preservative and then place a sheet of copper, with a weight of 10 ounces per square foot or greater, meeting the requirements of ASTM B370. Provide a cover measuring at least 4 inches more in each dimension greater than the diameter of the pile. Bend the cover down over the pile and fasten the edges with large head copper nails or three wraps of No. 12 copper wire.

**455-6.7.2 Fender and Bulkhead Piles:** Paint the heads of fender piles and of bulkhead piles with preservative and then cover with copper as provided above for piles supporting timber caps.

#### **455-7 Prestressed Concrete Piling.**

**455-7.1 Description:** Provide prestressed concrete piles that are manufactured, cured, and driven in accordance with the Contract Documents. Provide piles full length without splices when transported by barge or the pile length is less than or equal to 120 feet. When piles are transported by truck and the pile length exceeds 120 feet or the maximum length for a 3-point

pick-up according to Standard Plans, Index 455-001, and splicing is desired, provide minimal splices. Include the cost of the splices in the cost of the pile.

**455-7.2 Manufacture:** Fabricate piles in accordance with Section 450. When embedded gauges will be used for dynamic load testing, supply and install in square prestressed concrete piles in accordance with Standard Plans Index 455-003. Ensure the embedded gauges are installed by personnel approved by the manufacturer.

**455-7.3 Storage and Handling:**

**455-7.3.1 Time of Driving Piles:** Drive prestressed concrete piles at any time after the concrete has been cured in accordance with Section 450, and the concrete compressive strength is equal to or greater than the specified 28 day compressive strength.

**455-7.3.2 Storage:** Support piles on adequate dunnage both in the prestress yard and at the job site in accordance with the locations shown in the Standard Plans to minimize undue bending stresses or creating a sweep or camber in the pile.

**455-7.3.3 Handling:** Handle and store piles in the manner necessary to eliminate the danger of fracture by impact or of undue bending stresses in handling or transporting the piles from the forms and into the leads. In general, lift concrete piles by means of a suitable bridge or slings attached to the pile at the locations shown in the Standard Plans. Construct slings used to handle piles of a fabric material or braided wire rope constructed of six or more wire ropes which will not mar the corners or the surface finish of the piles. Do not use chains to handle piles. During transport, support concrete piles at the lifting locations shown in the Standard Plans or fully support them throughout 80% or more of their length. In handling piles for use in salty or brackish water, exercise special care to avoid damaging the surface and corners of the pile. If an alternate transportation support arrangement is desired, submit calculations, signed and sealed by the Specialty Engineer, for acceptance by the Engineer prior to transporting the pile. Calculations must show that the pile can be transported without exceeding the bending moments calculated using the support locations shown in the Plans.

**455-7.4 Cracked Piles:** The Engineer will reject any pile that becomes cracked in handling to the point that a transverse or longitudinal crack extends through the pile, shows failure of the concrete as indicated by spalling of concrete on the main body of the pile adjacent to the crack, which in the opinion of the Engineer will not withstand driving stresses, or becomes damaged during installation. The Engineer will not reject any pile for the occasional minor surface hairline cracking caused by shrinkage.

Do not drive piling with irreparable damage, which is defined as any cracks that extend through the pile cross-sectional area that are, or will be, below ground or water level at the end of driving. Remove and replace broken piles or piles cracked to the extent described above at no expense to the Department. The Engineer will accept cracks less than 0.005 inches which do not extend through the pile. Using approved methods, cut off and splice or build-up to cut-off elevation piles with cracks greater than 0.005 inches at the pile head or above ground or water level, and piles with cracks above ground or water level which extend through the cross-sectional area of the pile. The Engineer, at his discretion, may require correction of pile damage or pile cracks by cutting down the concrete to the plane of sound concrete below the crack and rebuilding it to cut-off elevation, or the Engineer may reject the pile. Extract and replace rejected piles that cannot be repaired, at no expense to the Department.

Take appropriate steps to prevent the occurrence of cracking, whether due to handling, transporting or driving.

**455-7.5 Preparation for Transportation:** Cut strands flush with the surface of the concrete using an abrasive cutting blade before transporting the piles from the casting yard.

Cut and patch the metal lifting devices in accordance with 450-9.2.1.

**455-7.6 Method of Driving:** Unless otherwise directed, drive piles by a hammer or by means of a combination of water jets and hammer when jetting is allowed. When using jets in combination with a hammer, withdraw the jets and drive the pile by the hammer alone to secure final penetration and to rigidly fix the tip end of the pile. Keep jets in place if they are being used to continuously eliminate the soil resistance in the scour zone.

**455-7.7 Extensions and Build-ups Used to Increase Production Lengths:**

**455-7.7.1 General:** Where splices, extensions and build-ups for concrete piles are necessary, construct them in accordance with Standard Plans, Index 455-002.

These requirements are not applicable to specially designed piling. Make splices for special pile designs as shown in the Plans.

**455-7.7.2 Extensions to be Driven or Those 21 feet or Longer:** Construct extensions to be driven or extensions 21 feet or longer in length in accordance with the details shown in the Plans and in a manner including the requirements, sequences, and procedures outlined below:

1. Cast a splice section in accordance with Section 450 with the dowel steel in the correct position and alignment.
2. Drill dowel holes using an approved steel template that will position and align the drill bit during drilling. Drill holes a minimum of 2 inches deeper than the length of the dowel to be inserted.
3. Clean the drilled dowel holes by inserting a high pressure air hose to the bottom of the hole and blowing the hole clean from the bottom upward. Eliminate any oil, dust, water, and other deleterious materials from the holes and the concrete surfaces to be joined.
4. Place forms around joints between the pile sections.
5. Mix the adhesive components in accordance with the manufacturer's directions. Do not mix sand or any other filler material with the epoxy components unless it is prepackaged by the manufacturer for this specific purpose. Use adhesives meeting the requirements of Section 926 for Type B Epoxy Compounds.
6. After ensuring that all concrete surfaces are dry, fill the dowel holes with the adhesive material.
7. Insert the dowels of the spliced section into the adhesive filled holes of the bottom section and position the spliced section so that the axes of the two sections are in concentric alignment and the ends of the abutting sections are spaced 1/2 inches apart. The Contractor may use small steel spacers of the required thickness provided they have 3 inches or more of cover after completing the splice. Fill the space between the abutting sections completely with the adhesive.
8. Secure the spliced sections in alignment until the adhesive is cured in accordance with the manufacturer's directions for the time appropriate with the prevailing ambient temperatures. Do not utilize the crane to secure the pile extension during the adhesive cure time. Utilize alignment braces to maintain the proper pile alignment during the epoxy cure time.
9. After curing is completed, remove alignment braces and forms and clean and dress the spliced area to match the pile dimensions.

When dowel splices need to be driven, perform dynamic instrumentation during the driving of each dowel spliced pile to monitor and control the stresses and to verify the splicing integrity. Replace any damaged pile splices in accordance with 455-3. Provide the Engineer 48 hours advance notification prior to driving spliced piles.

**455-7.7.3 Precast Reinforced Non-Drivable Build-ups less than 21 feet:**

Construct precast reinforced non-drivable build-ups less than 21 feet in accordance with the requirements of this Subarticle, Section 346, and Section 400. Provide the same material for the form surfaces for precast build-ups as was used to form the prestressed piles. Use concrete of the same mix as used in the prestressed pile and dimension the cross-section the same as piling being built up. Install build-ups as specified in 455-7.7.2(2) through 455-7.7.2(9). Apply to the build-ups the same surface treatment or sealant applied to the prestressed piles.

**455-7.8 Pre-Planned Splices:** Construct splices in accordance with the dowel splice method contained in the Standard Plan Indexes or using proprietary splices which are listed on the Department’s Approved Product List (APL). Splice test piles in the same manner as the production piles. Include in the pile installation plan, the chosen method of splicing and the approximate locations of the splice. Generally, place the splice at approximately the midpoint between the estimated pile tip and the ground surface, considering scour if applicable. Stagger the splice location between adjacent piles by a minimum of 10 feet. Obtain the Engineer’s approval prior to constructing any pile sections. Construct piles which are to be spliced using the dowel splice with preformed dowel holes in the bottom section and embedded dowels in the upper section.

When dowel splices need to be driven, perform dynamic instrumentation during the driving of each dowel spliced pile to monitor and control the stresses and verify the splicing integrity. Replace any damaged pile splices in accordance with 455-3. Provide the Engineer 48 hours advance notification prior to driving spliced piles.

Mechanical pile splices must be capable of developing the following capacities in the pile section unless shown otherwise in the Plans and capable of being installed without damage to the pile or splice:

1. Compressive strength = (Pile Cross sectional area) x (28 day concrete strength)
2. Tensile Strength = (Pile Cross sectional area) x 900 psi

Pile Size (inches)	Bending Strength (kip-feet)
18	245
20	325
24	600
30	950

**455-7.9 Pile Cut-offs:** After the completion of driving, cut piles off which extend above the cut-off elevation with an abrasive saw. Make the cut the depth necessary to cleanly cut through the prestressed strands. Take ownership and dispose of cut-off sections not used elsewhere as allowed by this Section.

**455-8 Steel Piling.**

**455-8.1 Description:** Furnish, splice, drive, and cut off structural steel shapes to form bearing piles. Include in this work the preparation of a smooth and square pile top meeting the



requirements of ASTM A252 or API 5L prior to driving, installation of structural steel bracing by bolting or welding, construction of splices and the filling of pipe piles with the materials specified in 455-8.9.

**455-8.2 Material:** For the material in steel piles, pile bracing, scabs, wedges, and splices, meet the requirements of Section 962.

**455-8.3 Pile Splices:** Order and use the full authorized pile length where practicable. Do not splice to obtain authorized lengths less than 40 feet except when shown in the Plans. Locate all splices in the authorized pile length in portions of the pile expected to be at least 15 feet below the final ground surface after driving. When it is not practicable to provide authorized pile lengths longer than 40 feet in a single length, use no more than one field splice per additional 40 feet of authorized pile length. Shop splices may be used to join single lengths of pile which are at least 20 feet in length. One shorter segment of pile may be used to achieve the authorized pile length when needed.

Where the pile length authorized is not sufficient to obtain the required bearing value or penetration, order an additional length of pile and splice it to the original length.

Make all splices in accordance with details shown in the Plans and in compliance with the general requirements of AWS D1.1 or American Petroleum Institute Specification 5L (API 5L).

**455-8.4 Welding:** Make all welded connections to steel piles by electric arc welding, in accordance with details shown in the Plans and in compliance with the general requirements of AWS D1.5. Electroslag welding is not permitted. Welds will be inspected by visual methods.

**455-8.5 Pile Heads and Tips:** Cut off all piles at the elevation shown in the Plans. If using a cutting torch, make the surface as smooth as practical.

Where foundation material is so dense that the Contractor cannot drive the pile to the required penetration and firmly seat it without danger of crumpling the tip, reinforce the tips with cast steel point protectors. Construct point protectors in one piece of cast steel meeting the requirements of ASTM A27, Grade 65-35 heat treated to provide full bearing for the piles. Attach points by welding according to the recommendations of the manufacturer.

**455-8.6 Pile Bent Bracing Members:** Place structural steel sway and cross bracing, and all other steel tie bracing, on steel pile bents and bolt or weld in place as indicated in the Plans. Where piles are not driven into position in exact alignment as shown in the Plans, furnish and place fills and shims as required to square and line up faces of flanges for cross bracing.

**455-8.7 Coating:** Coat exposed parts of steel piling, wedging, bracing, and splices in accordance with the provisions for coating structural steel as specified in Section 560.

**455-8.8 Storage and Handling:** While handling or transporting the piles from the point of origin and into the leads, store and handle in the manner necessary to avoid damage due to bending stresses. In general, lift steel piles by means of a suitable bridge or a sling attached to the pile at appropriate points to prevent damage. Lift the pile from the horizontal position in a manner that will prevent damage due to bending of the flanges and/or web.

**455-8.9 Filling Pipe Piles:** Ensure closed-end pipe piles are watertight. When required by the Plans, fill pipe piles with the specified materials. Use clean concrete sands and concrete meeting the requirements of Section 346. Place concrete in open ended pipes containing water using methods in accordance with 455-15.9 with modified tremie and pump line sizes. Concrete may be placed directly into pipes which are dry. Construct and place reinforcement cages in accordance with 455-16, except the minimum number of spacers per level is three.

Reinforcement cages may be installed before concrete placement or after concrete placement is completed if proper alignment and position is obtainable.

#### **455-9 Sheet Piling.**

**455-9.1 Description:** Leave permanent piling in place as part of the finished work and remove temporary piling after each construction phase unless otherwise authorized by the Engineer.

**455-9.2 Materials:** Meet the following requirements:

Concrete .....	Section 346
Bar Reinforcement .....	Section 931
Prestressing Reinforcement .....	Section 933
Steel Sheet Piles* .....	Section 962

\*For temporary steel sheet piles meet the requirements specified in the Plans.

**455-9.3 Steel Sheet Piling:** Drive steel sheet piling and cut off true to line and grade. Install steel sheet piling with a suitable hammer. Remove and replace any section damaged during handling and installation at no additional expense to the Department.

**455-9.3.1 Method of Installation:** Where rock or strong material is encountered such that the sheet piles cannot be set to grade by driving, remove the strong material by other acceptable means, such as excavation and backfilling, drilling or by punching.

#### **455-9.4 Concrete Sheet Piling:**

**455-9.4.1 Description:** Ensure that concrete sheet piling is of prestressed concrete construction and manufactured, cured, and installed in accordance with the requirements of the Contract Documents

**455-9.4.2 Manufacture of Piles:** Ensure that the piles are fabricated in accordance with Section 450.

**455-9.4.3 Method of Installation:** Jet concrete sheet piling to grade where practical. Use a minimum of two jets. Provide water at the nozzles of sufficient volume and pressure to freely erode material adjacent to the piles. Where encountering rock or strong material, such that the sheet piles cannot be set to grade by jetting, remove the strong materials by other acceptable means, such as excavation and backfilling, drilling or by punching with a suitable punch.

**455-9.4.4 Grouting and Caulking:** Concrete sheet piles are generally detailed to have tongues and grooves on their lower ends, and double grooves on their upper ends. Where so detailed, after installation, clean the grooves of all sand, mud, or debris, and fully grout the grooves. Use approved plastic bags (sheaths) which will meet the shape and length of the groove to be grouted to contain the plastic grout within the double grooves. Provide grout composed of one part cement and two parts sand. Use clean A-3 sand or sand meeting the requirements of Section 902 in this grout. In lieu of sand-cement grout, the Contractor may use concrete meeting the requirements of Section 347, using small gravel or crushed stone coarse aggregate. Deposit the grout through a grout pipe placed within a watertight plastic sheath (bag) extending the full depth of the double grooves and which, when filled, completely fills the slot formed by the double grooves.

**455-9.5 Storage and Handling:** Handle and store all sheet piles in a manner to prevent damage. Handle long sheet piles with fabric slings or braided wire rope constructed of six or more wire ropes placed at appropriate lift points to prevent damage due to excessive bending.

#### **455-10 Pile Installation Plan (PIP).**

**455-10.1 General:** At the preconstruction conference or at least 15 days prior to driving the first pile, submit a Pile Installation Plan for review by the Engineer. The PIP shall be used to govern all pile installation activities. In the event that deviations from the PIP are observed, the Engineer may perform Independent Verification Testing/Review of the Contractor's equipment, procedures, personnel and PIP at any time during production pile driving. If, as determined by the Engineer, pile driving equipment, procedures and/or personnel for the PIP is deemed inadequate to consistently provide undamaged driven piling meeting the contract requirements, the Contractor's PIP acceptance may be withdrawn pending corrective actions. Production driving shall then cease and not restart until corrective actions have been taken and the PIP re-accepted.

Ensure the Pile Driving Installation Plan information includes the following:

1. List and size of proposed equipment including cranes, barges, driving equipment, jetting equipment, compressors, and preformed pile hole equipment on the Department's Pile Driving Installation Plan Form (Form No. 700-020-01). Include manufacturer's data sheets on hammers.
2. Methods to determine hammer energy in the field for determination of pile capacity. Include in the submittal necessary charts and recent calibrations for any pressure measuring equipment.
3. Detailed drawings of any proposed followers.
4. Detailed drawings of templates.
5. Details of proposed load test equipment and procedures, including recent calibrations of jacks and required load cells.
6. Sequence of driving of piles for each different configuration of pile layout.
7. Details of proposed features and procedures for protection of existing structures.
8. Required shop drawings for piles, cofferdams, etc.
9. Methods and equipment proposed to prevent displacement of piles during placement and compaction of fill within 15 feet of the piles.
10. Methods to prevent deflection of battered piles due to their own weight and to maintain their as-driven position until casting of the pile cap is complete.
11. Proposed pile splice locations and details of any proprietary splices anticipated to be used.
12. Methods and equipment proposed to prevent damage to voided or cylinder piles due to interior water pressure.
13. Name and experience record of pile driving superintendent or foreman in responsible charge of pile driving operations. Ensure the pile driving superintendent or foreman in responsible charge of the pile driving operations has the experience requirements of 105-8.13 installing driven piles of the size and depth shown in the Plans.
14. The names of the CTQP qualified inspectors assigned to inspect the pile installation. If the Dynamic Testing Engineer is also a CTQP qualified pile driving inspector and is able to perform both operations, then an additional pile driving inspector is not required when driving piles using embedded sensors.
15. The quality control processes to ensure the required capacity is achieved in all piles. Include in the PIP the steps and analyses that would be performed when

driving conditions change (such as unanticipated tip elevations, hammer modifications, presence of temporary piles and structures, preforming, changes, etc.).

16. The name and contact information for the single representative of the Contractor, independent of field operations personnel, to resolve to the Engineer's satisfaction conflicts in the driving procedures or interpretations of the driving criteria. This person shall be available within two hours notice, and shall have the authority to refer issues to higher levels (corporate, if needed).

17. A letter from the GFDEOR certifying concurrence with the PIP.

Notify the Engineer of any test pile driving and production pile driving at least 1 week prior to beginning the installation operations of any pile.

**455-10.2 Acceptance of the Pile Installation Plan:** The Engineer will evaluate the PIP for conformance with the Contract Documents. Within five working days, excluding weekends and Department observed holidays, after receipt of the plan, the Engineer will notify the Contractor of any comments and additional information required and/or changes that may be necessary to satisfy the Contract Documents. Submit changes and respond to the Engineer's comments and allow at least two working days, excluding weekends and Department observed holidays, for the Engineer to review the revised PIP.

All equipment and procedures are subject to satisfactory field performance. Make required changes to correct unsatisfactory field performance. The Engineer will give final acceptance after the Contractor makes necessary modifications. Do not make any changes in the driving system after acceptance without a revised PIP with concurrence of the GFDEOR and acceptance by the Engineer. A hammer repaired on site or removed from the site and returned is considered to have its performance altered (efficiency increased or decreased), which is considered a change in the driving system. Perform a dynamic load test in accordance with 455-5.14 on the first pile driven with this hammer to confirm the driving criteria is still appropriate at no additional compensation.

Acceptance of the PIP by the Engineer does not relieve the Contractor of the responsibility to perform the work in accordance with the Contract Documents. The Engineer's acceptance is not a guarantee that the chosen methods and equipment are capable of obtaining the required results; this responsibility lies with the Contractor.

ARTICLE 455-11 is deleted:

#### **455-12 Basis of Payment.**

Contract Price includes all labor, equipment and materials required for furnishing, installing, and certifying completed pile foundations, in place and accepted. No separate payment will be made for any items of work associated with the construction of piling. No additional payment or adjustments will be made for set-checks, re-drives, dynamic load tests, pile instrumentations, splice installations and driving, build-ups, pile extractions, preformed holes or other associated activities.

### **C. DRILLED SHAFTS**

#### **455-13 Description.**

Construct drilled shaft foundations consisting of reinforced concrete drilled shafts.

**455-14 Materials.**

**455-14.1 Concrete:** Use concrete meeting the requirements of Section 346, unless otherwise shown in the Plans.

**455-14.2 Reinforcing Steel:** Meet the reinforcing steel requirements of Section 415.

**455-15 Construction Methods and Equipment.**

**455-15.1 General Requirements:**

**455-15.1.1 Templates:** When drilling from a barge, provide a fixed template, adequate to maintain shaft position and alignment during all excavation and concreting operations. Do not use floating templates (attached to a barge). When the Contractor fails to properly maintain shaft position and alignment without use of a template when drilling on land, provide a fixed template, adequate to maintain shaft position and alignment during all excavation and concreting operations.

**455-15.1.2 Drilled Shaft Installation Plan (DSIP):** At the preconstruction conference or at least 15 days prior to constructing the first drilled shaft, submit a Drilled Shaft Installation Plan (DSIP) for review and acceptance by the Engineer. The DSIP will be used to govern all drilled shaft construction activities. In the event that deviations from the DSIP are observed, the Engineer may perform Independent Verification Testing/Review of the Contractor's equipment, procedures and personnel at any time during production drilled shaft construction. If, as determined by the Engineer, drilled shaft construction equipment, procedures or personnel is deemed inadequate to consistently provide drilled shafts meeting the contract requirements, the Contractor's DSIP may be withdrawn pending corrective actions. All drilled shaft construction activities shall then cease and not restart until corrective actions have been taken and the DSIP has been re-accepted.

Include in the DSIP the following details:

1. Name and experience record of drilled shaft superintendent or foreman in responsible charge of drilled shaft operations. Ensure the drilled shaft superintendent or foreman in responsible charge of the drilled shaft operations has the experience requirements of 105-8.13 installing drilled shafts of the size and depth shown in the Plans using the following methods:

- a. Wet Method (mineral and polymer slurry),
- b. Casings up to the length shown in the Plans,
- c. Shaft drilling operations on water under conditions as

shown in the Plans.

2. List and size of proposed equipment, including, but not limited to, cranes, drills, augers, bailing buckets, final cleaning equipment, desanding equipment, slurry pumps, core sampling equipment, tremies or concrete pumps, and casings and equipment to install and remove casing.

3. Details of sequence of construction operations and sequence of shaft construction in bents or shaft groups.

4. Details of shaft excavation methods, including casing installation procedures.

5. Details of slurry, including proposed methods to mix, circulate, desand, test methods, and proposed CTQP certified technicians that will perform and document the fluid tests.

6. Details of proposed methods to clean the shaft excavation.

7. Details of shaft reinforcement, including methods to ensure centering/required cover, cage integrity during placement, placement procedures, cage support, and tie downs.
8. Details of concrete placement, including elapsed concrete placement times and proposed operational procedures for concrete tremie or pump, including initial placement, raising during placement, and overfilling of the shaft concrete. Include provisions to ensure proper final shaft cutoff elevation.
9. Details of casing removal when removal is required, including minimum concrete head in casing during removal.
10. Required submittals, including shop drawing and concrete design mixes.
11. Details of any required load tests, including equipment and procedures, and recent calibrations for any jacks or load cells.
12. Proposed Cross-Hole Sonic Logging (CSL) and Thermal Integrity Testing for Drilled (TITDS) Specialty Engineer to supervise field testing and report the test results.
13. Methods and equipment proposed to prevent displacement of casing and/or shafts during placement and compaction of fill.
14. Provide the make and model of the shaft inspection device, if applicable, and procedures for visual inspection.
15. Details of environmental control procedures used to prevent loss of slurry or concrete into waterways or other protected areas.
16. Proposed schedule for test shaft installation, load tests and production shaft installation.
17. For drilled shafts for constructed using polymer slurry, identify the polymer slurry meeting the requirements of 455-15.8.3, the pH and viscosity ranges recommended by the manufacturer for the materials to be excavated and a description of the mixing method to be used. Submit the Material Safety Data Sheets (SDS) for the product, and a current certification that the polymer slurry and components meet the requirements of 455-15.8.3. The certification shall be attested to within the past one year by a person having legal authority to bind the manufacturing company. Submit the contact information for the manufacturer's representative available for immediate contact during shaft construction and the representative's schedule of availability.
18. Methods to identify and remediate drilled shaft deficiencies.
19. Names of the CTQP qualified inspectors assigned to inspect the drilled shaft installation.
20. The name and contact information for the single representative of the Contractor, independent of field operations personnel, to resolve to the Engineer's satisfaction, conflicts in the drilled shaft installation procedures. This person shall be available within two hours notice, and shall have the authority to refer issues to higher levels (corporate, if needed).
21. Procedure for grouting non-destructive testing access tubes.
22. A letter from the GFDEOR certifying concurrence with the DSIP.

#### **455-15.1.2.1 Acceptance of the Drilled Shaft Installation Plan (DSIP).**

The Engineer will evaluate the DSIP for conformance with the Contract Documents. Within

five working days, excluding weekends and Department observed holidays, after receipt of the plan, the Engineer will notify the Contractor of any comments and additional information required and/or changes that may be necessary in the opinion of the Engineer to satisfy the Contract Documents. The Engineer will reject any part of the plan that is unacceptable. Submit changes agreed upon for reevaluation. The Engineer will notify the Contractor within two working days, excluding weekends and Department observed holidays, after receipt of proposed changes of their acceptance or rejection. All equipment and procedures are subject to trial and satisfactory performance in the field.

Acceptance by the Engineer does not relieve the Contractor of the responsibility to perform the work in accordance with the Contract Documents. The Engineer's acceptance is not a guarantee that the chosen methods and equipment are capable of obtaining the required results, this responsibility lies with the Contractor.

**455-15.1.3 General Methods & Equipment:** Perform the excavations required for the shafts, through whatever materials encountered, to the dimensions and elevations shown in the Contract Documents, using methods and equipment suitable for the intended purpose and the materials encountered. Provide drilling tools with a diameter not smaller than one inch of the shaft diameter required in the Plans. Provide equipment capable of constructing shafts supporting bridges to a depth equal to the deepest shaft shown in the Plans plus 15 foot or plus three times the shaft diameter, whichever is greater, except when the Plans require equipment capable of constructing shafts to a deeper depth. Provide equipment capable of constructing shafts supporting sign, signal, lighting and ITS structures to a depth equal to the deepest shaft shown in the Plans plus 5 feet.

Construct drilled shafts according to the Contract Documents using generally either the dry method, wet method, casing method, or permanent casing method as necessary to produce sound, durable concrete foundation shafts free of defects. Use the permanent casing method only when required by the Plans. When the Plans describe a particular method of construction, use this method. When the Plans do not describe a particular method, propose a method on the basis of its suitability to the site conditions and submit it for acceptance by the Engineer.

Set a suitable temporary removable surface casing from at least 1 foot above the ground surface to at least 1-1/2 shaft diameters below the ground surface to prevent caving of the surface soils and to aid in maintaining shaft position and alignment. Do not use a temporary casing larger than 12 inches of the shaft diameter. Fill the oversized temporary casing with drilled shaft concrete at no additional expense to the Department. Withdraw the surface casing after concrete placement.

For drilled shafts installed to support sign, signal, lighting and ITS structures, provide temporary surface casings from at least 1 foot above the ground surface to at least 5 feet below the ground surface. For sign, signal, lighting and ITS structures foundations located within permanent sidewalks or within 5 feet of curb sections, provide temporary surface casings from no lower than the top of sidewalk to at least 5 feet below the ground surface.

For drilled shafts installed to support sign, signal, lighting and ITS structures, do not attempt to excavate the shaft using plain water or natural slurry. Do not attempt to excavate the shaft using dry construction method unless specifically indicated in the Plans or approved by the Engineer.

**455-15.2 Dry Construction Method:** Use the dry construction method only at sites where the ground water table and soil conditions, generally stiff to hard clays or rock above the

water table, make it feasible to construct the shaft in a relatively dry excavation and where the sides and bottom of the shaft are stable and may be visually inspected prior to placing the concrete.

In applying the dry construction method, drill the shaft excavation, remove accumulated seepage water and loose material from the excavation and place the shaft concrete in a relatively dry excavation.

Use the dry construction method only when shaft excavations, as demonstrated in a test hole, have 12 inches or less of seepage water accumulated over a four hour period, the sides and bottom remain stable without detrimental caving, sloughing, or swelling for a four hour period, and the loose material and water can be satisfactorily removed prior to inspection and prior to placing concrete. Use the wet construction method or the temporary casing construction method for shafts that do not meet the requirements for the dry construction method.

**455-15.3 Wet Construction Method:** Use the wet construction method at all sites where it is impractical to provide a dry excavation for placement of the shaft concrete.

The wet construction method consists of keeping the shaft excavation filled with fluid (mineral slurry, polymer slurry, natural slurry or water), desanding and cleaning the slurry and final cleaning of the excavation by means of a bailing bucket, air lift, submersible pump or other suitable devices and placing the shaft concrete (with a tremie or concrete pump extending to the shaft bottom) which displaces the water or slurry during concreting of the shaft excavation.

Where drilled shafts are located in open water areas, construct the shafts by the wet method using exterior casings extending from above the water elevation into the ground to protect the shaft concrete from water action during placement and curing of the concrete. Install the exterior casing in a manner that will produce a positive seal at the bottom of the casing so that there is no intrusion or extrusion of water or other materials into or from the shaft excavation.

**455-15.4 Temporary Casing Construction Method:** Use the temporary casing method at all sites where it is inappropriate to use the dry or wet construction methods without the use of temporary casings other than surface casings. In this method, the casing is advanced prior to excavation and withdrawn after concrete placement. When a formation is reached that is nearly impervious, seal in the nearly impervious formation. Proceed with drilling as with the wet method to the projected depth. Proceed with the placement of the concrete as with the dry method. In the event seepage conditions prevent use of the dry method, complete the excavation and concrete placement using wet methods.

Where drilling through materials having a tendency to cave, advance the excavation by drilling in a mineral or polymer slurry. In the event that a caving layer or layers are encountered that cannot be controlled by slurry, install temporary removable casing through such caving layer or layers. The Engineer may require overreaming to the outside diameter of the casing. Take whatever steps are required to prevent caving during shaft excavation including installation of deeper casings. If electing to remove a casing and replace it with a longer casing through caving soils, backfill the excavation. The Contractor may use soil previously excavated or soil from the site to backfill the excavation. The Contractor may use other acceptable methods which will control the size of the excavation and protect the integrity of the foundation soils to excavate through caving layers.

Before withdrawing the casing, ensure that the level of fresh concrete is at such a level that the fluid trapped behind the casing is displaced upward. As the casing is withdrawn, maintain the level of concrete within the casing so that fluid trapped behind the casing is



displaced upward out of the shaft excavation without mixing with or displacing the shaft concrete.

The Contractor may use the casing method, when accepted by the Engineer, to construct shafts through weak caving soils that do not contribute significant shaft shear resistance. In this case, place a temporary casing through the weak caving soils before beginning excavation. Conduct excavation using the dry construction method where appropriate for site conditions and the wet construction method where the dry construction method is not appropriate. Withdraw the temporary casing during the concreting operations unless the Engineer accepts otherwise.

**455-15.5 Permanent Casing Construction Method:** Use the permanent casing method when required by the Plans. In this method, place a casing to the prescribed depth before beginning excavation. If the Contractor cannot attain full penetration, the Contractor may excavate through the casing and advance the casing until reaching the desired penetration.

Construct the shaft in accordance with 455-15.4 except for cutting the casing off at the prescribed elevation upon reaching the proper construction sequence and leaving the remainder of the casing in place.

**455-15.5.1 Temporary Extension of Permanent Casing:** When the wet method does not provide enough support to excavate and clean the drilled shaft extension below the permanent casing tip elevations shown in the Plans, the permanent casing may be temporarily extended to an elevation deeper than the tip elevation at no additional expense to the Department. The rock socket length must be extended as specified in 455-15.7 and the casing raised to the original casing tip elevation shown in the Plans after the concrete placement. Include details of this procedure in the DSIP for the Engineer's review and approval.

**455-15.5.2 Temporary Casing to Stabilize Excavation below Permanent Casing:** To stabilize the excavation below the permanent casing tip elevation, a temporary casing inside an oversized permanent casing may be used at no additional expense to the Department. The permanent casing must have an inside diameter no more than 6 inches larger than the drilled shaft diameter specified in the Plans.

The following requirements apply:

1. Excavate and clean the materials from inside the permanent casing. Ensure all materials are removed from the inside wall of the permanent casing.
2. Install the temporary casing prior to excavating below the permanent casing tip elevation. The temporary casing must have a minimum internal diameter equal to the shaft diameter required in the Plans.
3. If the temporary casing is advanced deeper than the minimum top of rock socket elevation as shown in the Plans, or the top of rock elevation if deeper, extend the rock socket length in accordance with 455-15.7.
4. Place concrete in accordance with 455-15.9.3 through the temporary casing. Do not allow concrete to fall or overflow into the annular space between the temporary and permanent casing.
5. After placement of the concrete, remove the temporary casing in accordance with 455-15.4, 455-15.7 and 455-17. During withdrawal of the temporary casing, maintain adequate concrete head in both the temporary and permanent casings to avoid breaching, caving, or contamination of the concrete.

Include details of this procedure in the DSIP for the Engineer's review and approval.

**455-15.6 Excavations:** When pilot holes and/or load tests are performed, the GFDEOR shall use the pilot hole and load test results when load tests are performed to determine the production tip elevations and/or the installation criteria of the drilled shafts. Drilled shaft construction shall not begin until the proposed shaft tip elevations are accepted by the Engineer.

**455-15.6.1 Pilot Hole:** When pilot holes are shown in the Plans core a pilot hole, prior to shaft excavation, in accordance with ASTM D2113 Standard Practice for Rock Core Drilling and Sampling of Rock for Site Excavation and the Department's Soils & Foundations Handbook using a double or triple wall core barrel through part or all of the shaft, to a minimum depth of 3 times the diameter of the drilled shaft below the tip elevation shown in the Plans. Prior to excavating load test shafts, provide pilot holes to a minimum depth of three times the diameter of the drilled shaft below the tip elevation designed for these shafts. For test holes, provide pilot holes prior to excavation, to a minimum depth of 5 feet below the tip of the test hole.

**455-15.6.2 Cores:** Take cores to determine the character of the material directly below the shaft excavation when pilot borings are not performed at the shaft location. Provide equipment to retrieve the core from a depth of 5 times the diameter of the drilled shaft below the bottom of the drilled shaft excavation in accordance with ASTM D2113 Standard Practice for Rock Core Drilling and Sampling of Rock for Site Excavation. Cut the cores with an acceptable core barrel to a minimum depth of 3 times the diameter of the drilled shaft below the bottom of the drilled shaft excavation after completing the shaft excavation, as directed by the Engineer.

For cores or pilot holes, use only a double or triple wall core barrel designed:

1. to cut a core sample from 4 inches to 6 inches in diameter, at least 5 feet in length, and,
2. so that the sample of material cored can be removed from the shaft excavation and the core barrel in an undisturbed state.

When called for in the Plans and approved by the Engineer, substitute Standard Penetration Tests (SPT) using a drill rig equipped with an automatic hammer for coring.

Provide areas for the disposal of unsuitable materials and excess materials as defined in 120-5 that are removed from shaft excavations, and dispose of them in a manner meeting all environmental requirements.

Furnish the additional drilled shaft concrete over the theoretical amount required to complete filling any excavations for shafts which are larger than required by the Plans or authorized by the Engineer, at no expense to the Department.

**455-15.6.3 Production Shaft Tip Elevations:** After completion of load tests, pilot holes, rock cores and lab testing, the GFDEOR shall submit the required minimum rock socket lengths and shaft tip elevations to the Engineer in a signed and sealed letter for review and acceptance. This letter shall include the assumptions and geotechnical parameters used, the report of core borings of all pilot holes, rock core records, lab testing, load test reports prepared in accordance with 455-2.11, and numerical analysis and calculations. Submit this letter at least three working days, excluding weekends and Department observed holidays, prior to beginning production shaft construction. Additional data or analysis may be required by the Engineer.

Production shaft lengths may be based on the load transfer characteristics measured during the load test. End bearing characteristics may be based on load test results if the properties of the material below the tips of the production shafts meet or exceed the strength of the materials below the tip of the test shaft. If the theoretical bearing strength of the material

below the tips of the production shafts is less than the theoretical bearing strength of the materials below the tip of the test shaft, the production shafts shall be extended to meet design capacity by side shear only, unless the end bearing resistance of the weaker material is verified by additional load testing.

**455-15.7 Casings:** Ensure that casings are metal, of ample strength to withstand handling and driving stresses and the pressure of concrete and of the surrounding earth materials, and that they are smooth and water tight. Ensure that the inside diameter of casing is not less than the specified size of shaft except as provided below. The Department will not allow extra compensation for concrete required to fill an oversize casing or oversize excavation.

The Engineer will allow the Contractor to supply casing with an outside diameter equal to the specified shaft diameter (O.D. casing) provided additional shaft length is supplied at the shaft tip. Determine the additional length of shaft required by the following relationship:

$$\text{Additional Length} = \frac{(D_1 - D_2)L}{D_2}$$

where:

$D_1$  = casing inside diameter specified = shaft diameter specified

$D_2$  = casing inside diameter provided ( $D_2 = D_1$  minus twice the wall thickness).

$L$  = authorized shaft length below ground for temporary casing methods or below casing for permanent casing methods.

Bear all costs relating to this additional length including but not limited to the cost of extra excavation, extra concrete, and extra reinforcing steel.

Install and remove casing by rotating, exerting downward pressure, or with a vibratory hammer, unless otherwise shown in the Contract Documents. Remove all casings from shaft excavations except those used for the Permanent Casing Method. Ensure that the portion of casings installed under the Permanent Casing Method of construction below the shaft cut-off elevation remains in position as a permanent part of the drilled shaft. When casings that are to be removed become bound in the shaft excavation and cannot be practically removed, submit a proposed redesign to the Engineer for review and acceptance.

If temporary casing is advanced deeper than the minimum top of rock socket elevation shown in the Plans or actual top of rock elevation if deeper, withdraw the casing from the rock socket and overream the shaft. If the temporary casing cannot be withdrawn from the rock socket before final cleaning, extend the length of rock socket below the authorized tip elevation one-half of the distance between the minimum top of rock socket elevation or actual elevation if deeper, and the temporary casing tip elevation.

Form drilled shafts extending through a body of water with permanent casings. When the shaft extends above ground or a body of water, the Contractor may form the exposed portion with removable casing, unless otherwise specified in the Plans. Remove the portion of metal casings between an elevation 2 feet below the lowest water elevation or 2 feet below ground whichever is higher and the top of shaft elevation after the concrete is cured. Remove casings to expose the concrete as required above in a manner which will not damage the drilled shaft concrete. Dismantle removable casings in accordance with the provisions of 455-17.5.

When practical, do not start the removal until completing all concrete placement in the shaft. Extract casing at a slow, uniform rate with the pull in line with the axis of the shaft. Withdraw temporary casings while the concrete remains fluid.

When conditions warrant, the Contractor may pull the casing in partial stages. Maintain a sufficient head of concrete above the bottom of the casing to overcome the hydrostatic pressure of water outside the casing. At all times maintain the elevation of the concrete in the casing high enough to displace the drilling slurry between the outside of the casing and the edge of the hole while removing the casing.

Expandable or split casings that are removable are not permitted for use below water.

#### **455-15.8 Slurry and Fluid in Excavation:**

**455-15.8.1 General:** Thoroughly premix the slurry with clean fresh water prior to introduction into the shaft excavation. Introduce slurry before the excavation advances below the bottom of the casing. Ensure that the percentage of polymer or mineral admixture used to make the suspension is such as to maintain the stability of the shaft excavation. The Engineer will require adequate water or slurry tanks when necessary to perform the work in accordance with these Specifications. The Engineer will not allow excavated pits on projects requiring slurry tanks without the written permission of the Engineer. Take the steps necessary to prevent the slurry from “setting up” in the shaft, including but not limited to agitation, circulation, and adjusting the composition and properties of the slurry. Provide suitable offsite disposal areas and dispose of all waste slurry in a manner meeting all requirements pertaining to pollution.

Provide a CTQP qualified drilled shaft inspector to perform control tests using suitable apparatus on the slurry mixture to determine the slurry and fluid properties as specified in sub-articles 455-15.8.2 to 455-15.8.4.

Measure the viscosity of the freshly mixed slurry regularly as a check on the quality of the slurry being formed using an approved measuring device.

Perform tests from the fluid in the excavation to determine density, viscosity, and pH value to establish a consistent working pattern, taking into account the mixing process and blending of freshly mixed slurry and previously used slurry. Repeat tests to determine density, viscosity, and pH value at intervals not exceeding 2 hours during the first 8 hours slurry is in use and every 4 hours thereafter, including overnight, until concrete placement. Perform density, viscosity and pH tests again when the excavation reaches the midpoint.

The Department may perform comparison tests as determined necessary during the mineral and polymer slurry operations.

If, at any time in the opinion of the Engineer, the wet construction method fails to stabilize the excavation discontinue this method of construction, backfill the excavation and submit modifications in procedure or alternate means of construction for approval.

**455-15.8.2 Mineral Slurry:** When mineral slurry is used in an excavation, use only processed attapulgite or bentonite clays with up to 2% (by dry weight) of added polymer. Use mineral slurry having a mineral grain size such that it will remain in suspension and having sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Use a percentage and specific gravity of the material to make the suspension sufficient to maintain the stability of the excavation and to allow proper placement of concrete. Ensure that the material used to make the slurry is not detrimental to concrete or surrounding ground strata. During construction, maintain the level of the slurry at a height sufficient to prevent caving of the hole. In the event of a sudden significant loss of slurry such that the slurry level cannot

practically be maintained by adding slurry to the hole, backfill the excavation and delay the construction of that foundation until an alternate construction procedure has been approved.

Perform the following tests on the mineral slurry supplied to and in the shaft excavation and ensure that the results are within the ranges stated in the table below:

Item to be measured	Range of Results at 68°F	Test Method
Density	64 to 73 lb/ft <sup>3</sup> (in fresh water environment) 66 to 75 lb/ft <sup>3</sup> (in salt water environment)	Mud density balance: FM 8-RP13B-1
Viscosity	30 to 40 seconds	Marsh Cone Method: FM 8-RP13B-2
pH	8 to 11	Electric pH meter or pH indicator paper strips: FM 8-RP13B-4
Sand Content	4% or less	FM 8-RP13B-3

The Contractor may adjust the limits in the above table when field conditions warrant as successfully demonstrated in a test hole or with other methods approved by the Engineer. The Engineer must approve all changes in writing before the Contractor can continue to use them.

During construction, maintain the level of mineral slurry in the shaft excavation within the excavation and at a level not less than 4 feet above the highest expected piezometric water elevation along the depth of a shaft.

**455-15.8.3 Polymer Slurry:** Materials manufactured expressly for use as polymer slurry for drilled shafts that meet the requirements of this subarticle may be used as slurry for drilled shaft excavations. A representative of the manufacturer must be on-site or available for immediate contact to assist and guide the construction of the first three drilled shafts at no additional cost to the Department. This representative must also be available for on-site assistance or immediate contact if problems are encountered during the construction of the remaining drilled shafts. Use polymer slurry only if the soils below the casing are not classified as organic, and the pH of the fluid in the hole can be maintained in accordance with the manufacturer's published recommendations. Submit the SDS for the product, the manufacturer's published mixing procedures, and the manufacturer's published range of values for pH and viscosity of the mixed slurry. Submit a report in accordance with Section 2.4, Volume II of the Department's Material Manual, which may be viewed at the following URL:

<http://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section24V2.shtm> .

The report must include test results, certification and documentation that demonstrate the polymer slurry and additives meet the following requirements:

1. The polymer slurries to be used on the project and their waste products are classified as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA) Subpart C rules, Table 1 of 40 CFR 261.24 Toxicity Characteristic.
2. Pull out tests demonstrate the bond between the bar reinforcement and the concrete is not materially affected by exposure to the slurry under typical construction conditions, over the typical range of slurry viscosities to be used.

3. Load tests demonstrate the bond between the concrete and the soil is not materially affected by exposure to the polymer slurry under typical construction conditions, over the typical range of polymer slurry viscosities to be used.

4. The method of disposal meets the approval of all federal, state and local regulatory authorities.

Perform the following tests on the polymer slurry supplied to and in the shaft excavation and ensure that the results are maintained within the ranges stated in the table below:

Mixed Polymer Slurry Properties		
Item to be measured	Range of Results at 68°F	Test Method
Density	62 to 65 lb/ft <sup>3</sup> (fresh water) 64 to 67 lb/ft <sup>3</sup> (salt water)	Mud density balance: FM 8-RP13B-1
Viscosity	50 seconds to upper limit published by the manufacturer, limited by 455-15.8.3 (2) and (3) above, for materials excavated	Marsh Cone Method: FM 8-RP13B-2
pH	Range published by the manufacturer for materials excavated	Electric pH meter or pH indicator paper strips: FM 8-RP13B-4
Sand Content	0.5% or less	FM 8-RP13B-3

Premix polymer slurry in accordance with the manufacturer's published procedures. Do not mix in the excavation as a means to prepare slurry. When approved by the GFDEOR, adjustments to slurry properties can be made in the excavation.

During construction, maintain the level of the slurry at a height sufficient to prevent caving of the hole and which should not be lower than 4 feet above the highest expected piezometric water elevation along the depth of the shaft.

**455-15.8.4 Fluid In Excavation At Time Of Concrete Placement:** When any fluid is present in any drilled shaft excavation, including shafts to support sign, signal, lighting and ITS structures, the applicable test methods and reporting requirements described in 455-15.8.1, 455-15.8.2 and 455-15.8.3 apply to tests of fluid in the shaft prior to placing the concrete.

Test samples of the fluid in the shaft from within 1 inch of the base of the shaft and from the middle of the shaft height for shafts up to 60 feet in depth. Test samples of the fluid in the shaft from within 1 inch of the base of the shaft and at intervals not exceeding 30 feet up the shaft for shafts deeper than 60 feet. Use a sampling tool, approved by the Engineer, designed to sample over a depth range of 12 inches or less. Take whatever action is necessary prior to placing the concrete to bring the fluid within the specification and reporting requirements, outlined in the tables in 455-15.8.2 and 455-15.8.3, except as follows:

The Engineer will not require tests for pH or viscosity, nor require the fluid to meet the minimum density specified in 455-15.8.2 and 455-15.8.3 when neither polymer nor mineral slurry has been introduced into the shaft excavation.

**455-15.9 Tremies and Pumps:**

**455-15.9.1 General:** The requirements of the applicable provisions of Section 400 will apply when using a tremie or a pump to place drilled shaft concrete.

**455-15.9.2 Dry Excavations:** Ensure that the tremie for depositing concrete in a dry drilled shaft excavation consists of a tube of solid construction, a tube constructed of sections which can be added and removed, or a tube of other accepted design. The Contractor may pass concrete through a hopper at the top of the tube or through side openings as the tremie is retrieved during concrete placement. Support the tremie so that the free fall of the concrete is less than 5 feet at all times. If the free falling concrete causes the shaft excavation to cave or slough, control the movement of concrete by reducing the height of free fall of the concrete and/or reducing the rate of flow of concrete into the excavation.

**455-15.9.3 Wet Excavations:** Construct the tremie or pump line used to deposit concrete beneath the surface of water so that it is water-tight and will readily discharge concrete. Construct the discharge end of the tremie or pump line to prevent water intrusion and permit the free flow of concrete during placement operations. Ensure that the tremie or pump line has sufficient length and weight to rest on the shaft bottom before starting concrete placement.

During placement operations, ensure that the discharge end of the tremie or pump line is within 6 inches of the bottom of the shaft excavation until at least 10 feet of concrete has been placed. Ensure the discharge end of the tremie or pump line is continuously embedded at least 10 feet into the concrete after 10 feet of concrete has been placed and until the casing is overpoured sufficiently to eliminate all contaminated concrete. Ensure that the free fall of concrete into the hopper is less than 5 feet at all times. Support the tremie so that it can be raised to increase the discharge of concrete and lowered to reduce the discharge of concrete. Do not rapidly raise or lower the tremie to increase the discharge of the concrete. Maintain a continuous flow of concrete and a positive pressure differential of the concrete in the tremie or pump line at all times to prevent water or slurry intrusion into the shaft concrete.

**455-15.10 Excavation and Drilling Equipment:**

**455-15.10.1 General:** All shaft excavation is unclassified shaft excavation. Overream the drilled shaft sidewall when necessary. These terms are defined in 455-15.10.2, 455-15.10.3, and 455-15.10.4, respectively.

Use excavation and drilling equipment having adequate capacity, including power, torque, and crowd (downthrust), and excavation and overreaming tools of adequate design, size, and strength to perform the work shown in the Plans or described herein. When the material encountered cannot be drilled using conventional earth augers and/or underreaming tools, provide special drilling equipment, including but not limited to rock augers, core barrels, rock tools, air tools, blasting materials, and other equipment as necessary to continue the shaft excavation to the size and depth required. In the event blasting is necessary, obtain all necessary permits. The Contractor is responsible for the effects of blasting on already completed work and adjacent structures. The Engineer must approve all blasting.

**455-15.10.2 Unclassified Shaft Excavation:** Unclassified shaft excavation is defined as all processes required to excavate a drilled shaft of the dimensions shown in the Contract Documents to the depth indicated in the Plans plus 15 feet or plus 3 shaft diameters, whichever is deeper, completed and accepted. Include in the work all shaft excavation, whether the material encountered is soil, rock, weathered rock, stone, natural or man-made obstructions, or materials of other descriptions.

**455-15.10.3 Unclassified Extra Depth Excavation:** Unclassified extra depth excavation is defined as all processes required to excavate a drilled shaft of plan dimensions which is deeper than the limits defined as unclassified shaft excavation.

**455-15.10.4 Drilled Shaft Sidewall Overreaming:** Drilled shaft sidewall overreaming is defined as the unclassified excavation required to roughen its surface or to enlarge the drilled shaft diameter due to softening of the sidewalls or to remove excessive buildup of slurry cake when slurry is used. Increase the shaft radius a minimum of 1/2 inch and a maximum of 3 inches by overreaming. The Contractor may accomplish overreaming with a grooving tool, overreaming bucket, or other suitable equipment.

Meet the limit for depth of sidewall overreaming into the shaft sidewall material and the elevation limits between which sidewall overreaming is required.

**455-15.11 Inspection of Excavations:**

**455-15.11.1 Dimensions and Alignment:** Provide equipment for checking the dimensions and alignment of each permanent shaft excavation. Determine the dimensions and alignment of the shaft excavation under the observation and direction of the Department.

Generally, check the alignment and dimensions by any of the following methods as necessary:

1. Check the dimensions and alignment of dry shaft excavations using reference stakes and a plumb bob. Verify that the bottom of the hole is level.
2. Check the dimensions and alignment of casing when inserted in the excavation.

3. Use an acceptable caliper system

4. Insert any casing, rod or pipe assembly, or other device used to check dimensions and alignment into the excavation to full depth.

**455-15.11.2 Depth:** Generally, reference the depth of the shaft during drilling to appropriate marks on the Kelly bar or other suitable methods. Measure final shaft depths with a suitable weighted tape or other accepted methods after final cleaning.

**455-15.11.3 Shaft Inspection Device (SID):** Furnish all power and equipment necessary to inspect the bottom conditions of a drilled shaft excavation for bridge foundations and to measure the thickness of bottom sediment or any other debris using a SID. Provide a means to position and lower the SID into the shaft excavation to enable the bell housing to rest vertically on the bottom of the excavation. Continuously videotape the inspection of each drilled shaft excavation after final cleaning. Clearly identify in the recordings by audio or other means, the location and items being observed.

Furnish a SID meeting the following requirements:

1. A remotely operated, high resolution, color video camera sealed inside a watertight bell housing.

2. Provides a clear view of the bottom inspection on a video monitor at the surface in real time.

3. Provides a permanent record of the entire inspection with voice annotation on a quality DVD with a resolution of not less than 720 x 480.

4. Provides a minimum field of vision of 110 square inches, with at least two graduated measuring devices to record the depth of sediment on the bottom of the shaft excavation to a minimum accuracy of 1/2 inch and a length greater than 1-1/2 inches.

5. Provides sufficient lighting to illuminate the entire field of vision at the bottom of the shaft in order for the operator and inspector to clearly see the depth measurement scale on the video monitor and to produce a clear recording of the inspection.



6. Provides a regulated compressed air or gas system to precisely adjust the drilling fluid level within the bell housing, and a pressurized water system to assist in determination of bottom sedimentation depth

Obtain the Engineer's approval of the device in advance of the first inspection contingent on satisfactory field performance. Notify the Engineer for approval before a different device is used for any subsequent inspection.

**455-15.11.4 Shaft Cleanliness Requirements:** Adjust cleaning operations so a minimum of 50% of the bottom of each shaft will have less than 1/2 inches of sediment at the time of placement of the concrete. Ensure the maximum depth of sedimentary deposits or any other debris at any place on the bottom of the shaft excavation does not exceed 1-1/2 inches. Determine shaft cleanliness by visual inspection for dry shafts. For bridge foundations, use a shaft inspection device for wet shafts. For drilled shaft foundations for sign, signal, lighting and ITS structures the use of a weighted tape is permitted to verify level and clean hole bottom conditions at the time of concrete placement.

When using slurry, meet the requirements of 455-15.8 at the time of concrete placement.

**455-15.11.4.1 Exceptions for Shafts for Sign, Signal, Lighting and ITS Structures:** Ensure the depth of sedimentary deposits or other debris does not exceed 1 inch over the bottom of the shaft when installing drilled shafts to support sign, signal, lighting and ITS structures.

**455-15.11.5 Time of Excavation:** Overream the sidewalls of any unclassified excavation work using mineral slurry lasting more than 36 hours (measured from the beginning of excavation for all methods except the Temporary or Permanent Casing Method, which begins at the time excavation begins below the casing) before placement of the concrete. Ensure that the minimum depth of overreaming the shaft sidewall is 1/2 inches and the maximum depth is 3 inches. Provide any overreaming required at no expense to the Department when exceeding the 36 hour limit.

When using mineral slurry, adjust excavation operations so that the maximum time that slurry is in contact with the bottom 5 feet of the shaft (from time of drilling to concreting) does not exceed 12 hours. If exceeding the 12 hour time limit, overream the shaft socket or the full shaft when socket is not specified, at no additional expense to the Department prior to performing other operations in the shaft.

#### **455-16 Reinforcing Steel Construction and Placement.**

**455-16.1 Cage Construction and Placement:** Completely assemble and place as a unit the cage of reinforcing steel, consisting of longitudinal bars, ties, and cage stiffener bars, immediately after the Drilled Shaft Inspector inspects accepts the shaft excavation and immediately prior to placing concrete. Tie all intersections of drilled shaft reinforcing steel with cross ties or "figure 8" ties. Use double strand ties, ties with larger tie wire, U-bolts, or similar when necessary.

**455-16.2 Splicing Cage:** If the bottom of the constructed shaft elevation is lower than the bottom of the shaft elevation in the Plans, extend a minimum of one half of the longitudinal bars required in the upper portion of the shaft the additional length. Continue the tie bars for the extra depth, spaced on 2 foot centers, and extend the stiffener bars to the final depth. The Contractor may lap splice these bars or use unspliced bars of the proper length. Do not weld bars to the planned reinforcing steel unless shown in the Contract Documents.

For drilled shafts supporting sign, signal, lighting and ITS structures, if the shaft cleaning operations result in excavating below the required tip elevation, the reinforcing steel cage does not need to be extended. The reinforcing steel cage may be spliced to rest on the bottom of the excavation or suspended in place from the top.

**455-16.3 Support, Alignment, and Tolerance:** Tie and support the reinforcing steel in the shaft so that the reinforcing steel will remain within allowable tolerances as specified in 455-20 and Section 415.

Ensure concentric spacing for the entire length of the cage. As a minimum, use centering devices consisting of wheels or other approved noncorrosive spacing devices within 3 feet of the bottom, within 6 feet of the top, and intervals not exceeding 10 feet along the cage length. When a casing with an inside diameter (I.D.) larger than the required shaft diameter is used, provide, within the portion of the oversized casing, centering devices specially dimensioned to ensure the casing and the cage are concentric. Do not use block or wire type spacers. Ensure no metallic elements will be within the concrete cover space. Use a minimum of one spacer per 30 inches of circumference of cage with a minimum of four at each level. Provide spacers at the bottom of the drilled shaft reinforcing cage as required to maintain the proper position of the cage.

Check the elevation of the top of the steel cage before and after placing the concrete. If the cage is not within the specified tolerances, correct, and submit a revised DSIP to the Engineer for approval. Do not construct additional shafts until receiving approval from the Engineer.

**455-16.4 Nondestructive Integrity Testing Access Tubes:** Install access tubes full length in all drilled shafts from the tip of shaft to a point high enough above top of shaft to allow Thermal Integrity Testing for Drilled Shafts (TITDS) and Cross-Hole Sonic Logging (CSL) testing, but not less than 30 inches above the top of the drilled shaft, ground surface or water surface, whichever is higher. Equally space tubes around circumference of drilled shaft. Securely tie access tubes to the inside of the reinforcing cage and align tubes to be parallel to the vertical axis of the center of the cage. Access tubes from the top of the reinforcing cage to the tip of the shaft shall be NPS 1-1/2 Schedule 40 black iron or black steel (not galvanized) pipe. Access tubes above the top of the reinforcing cage may be the same black iron or black steel pipe or Schedule 40 PVC pipe. Ensure that the access tubes are free from loose rust, scale, dirt, paint, oil and other foreign material. Couple tubes as required with threaded couplers, such that inside of tube remains flush. Seal the bottom and top of the tubes with threaded caps. The tubes, joints and bottom caps shall be watertight. Seal the top of the tubes with lubricated, threaded caps sufficient to prevent the intrusion of foreign materials. Stiffen the cage sufficiently to prevent damage or misalignment of access tubes during the lifting and installation of the cage. Exercise care in removing the caps from the top of the tubes after installation so as not to apply excess torque, hammering or other stress which could break the bond between the tubes and the concrete.

Provide the following number (rounded up to the next whole number of tubes) and configuration of access tubes in each drilled shaft based on the diameter of the shaft.

Shaft Diameter	Number of Tubes Required	Configuration around the inside of Circular Reinforcing Cage
36 to 48 inches	4	90 degrees apart
Greater than 48 inches	1 tube per foot of Shaft Diameter	360 degrees divided by the Number of Tubes

Insert simulated or mock probes in each access tube prior to concreting to ensure the serviceability of the tube. Fill access tubes with clean potable water and recap prior to concreting. Repair or replace any leaking, misaligned or unserviceable tubes as in a manner acceptable to the Engineer prior to concreting.

For drilled shaft foundations requiring anchor bolts, verify access tubes will not interfere with anchor bolt installation before excavating the shaft. When access tube locations conflict with anchor bolt locations, move the access tube location plus or minus 2 inches along the inner circumference of the reinforcing cage.

For drilled shafts supporting sign, signal, lighting and ITS structures, if the shaft cleaning operations result in excavating below the required tip elevation, the access tubes do not need to be extended. If the reinforcing steel cage is suspended in place from the top rather than resting on the bottom of the excavation, clearly mark the top of shaft location on each tube.

When called for in the Contract Documents, provide embedded thermal wires and equipment to allow TITDS in accordance with ASTM D7949 Method B.

#### **455-17 Concrete Placement.**

**455-17.1 General:** Place concrete in accordance with the applicable portions of Sections 346 and 400, 455-15.2, 455-15.3, 455-15.4, 455-15.5, 455-15.8, 455-15.9, and the requirements herein.

Place concrete as soon as possible after completing all excavation, cleaning the shaft excavation, inspecting and finding it satisfactory, and immediately after placing reinforcing steel. Continuously place concrete in the shaft to the top of the casing. Continue placing concrete after the casing is full until good quality concrete is evident at the top of the casing. Place concrete through a tremie or concrete pump using accepted methods. After the shaft is overpoured sufficiently to eliminate all contaminated concrete, additional concrete may be added to the shaft without the use of a tremie or pump in accordance with Section 400.

If the pressure head is lost during concrete placement for any reason, perform integrity testing at no expense to the Department.

Immediately after concreting, check the water levels in the CSL access tubes and refill as necessary. If tubes become unserviceable, core new holes in the drilled shaft as directed by the Engineer.

**455-17.2 Placement Time Requirements:** The elapsed time for placing drilled shaft concrete includes the concrete mixing and transit time, the concrete placement time, the time required to remove any temporary casing that causes or could cause the concrete to flow into the space previously occupied by the casing, and the time to insert any required column steel, bolts, weldments, etc. The elapsed time begins at the time the first truck load placed in the shaft is batched. Maintain a minimum slump of 5 inches throughout the elapsed time. Use materials to produce and maintain the required slump through the elapsed time that meets the class of concrete specified. Provide slump loss tests that demonstrate to the Engineer that the concrete will maintain a 5 inch or greater slump for the anticipated elapsed time before beginning drilled shaft construction.

**455-17.3 Forms:** When the top of shaft elevation is above ground or above water, form the portion of the shaft above ground and the portion of the shaft above water with a removable form or another suitable method to the dimensions shown in the Plans

When the shaft extends above the ground through a body of water, the Contractor may form the portion through the water with removable forms except when the Permanent Casing Method is specified.

**455-17.4 Riser Blocks:** The Contractor may cast a riser block of equal diameter as the column and of a maximum height of 6 inches at the top of the completed shaft. When this option is chosen, extend any dowel steel above the top of shaft an additional 6 inches.

**455-17.5 Curing:** Cure the top surface in accordance with the applicable provisions of Section 400, and construct any construction joint area as shown in the Plans. Protect portions of drilled shafts exposed to a body of water from the action of water by leaving the forms in place for a minimum of seven days after casting the concrete. The Contractor may remove forms prior to seven days provided the concrete strength has reached 2,500 psi or greater as evidenced by cylinder breaks.

**455-17.6 Non-Destructive Testing of Drilled Shaft Integrity:**

**455-17.6.1 Thermal Integrity Testing for Drilled Shafts (TITDS):** Perform all TITDS testing in accordance with ASTM D7949. Test all drilled shafts in bridge bents or piers considered nonredundant in the Plans, using TITDS. For all other drilled shafts supporting bridges and sign, signal, lighting and ITS structures, perform TITDS on any shaft suspected of containing defects. The Engineer may select shafts for TITDS based on observations in the field or the review of the drilled shaft logs.

Engage a qualified Specialty Engineer to supervise the TITDS. The qualified TITDS Specialty Engineer must have a minimum six months experience of TITDS and have a Florida Licensed Professional Engineer and supervise the collection and interpretation of data. The individual performing the TITDS in the field must work for the Specialty Engineer firm and have a minimum of six months experience of TITDS. The Contractor shall provide all necessary access and assistance to the TITDS Specialty Engineer to satisfactorily perform the testing.

After acceptance of production shafts by the Engineer, remove all water from the access tubes or core holes and fill the tubes or core holes with a structural non-shrink grout meeting the requirements of Section 934 from the bottom via tremie tube. Place the grout utilizing enough pressure to fill the tubes or core holes completely.

If the Contractor determines at any time during the non-destructive testing and evaluation of the drilled shaft that the drilled shaft should be replaced, no further testing or evaluation of that shaft is required.

**455-17.6.1.1 Equipment:** Furnish TITDS test equipment in accordance with ASTM D7949 as follows:

1. Provide thermal probes with four orthogonally oriented infrared sensors able to be used in 1.5 inch I.D. pipes.
2. Provide a computer based TITDS data acquisition system for display of signals during data acquisition.
3. Provide a computer based TITDS data acquisition system for display of signals during data acquisition.
4. Provide an air compressor and power supply with sufficient pressure to air lift the water from the access tubes.

**455-17.6.1.2 Procedure:** Perform TITDS testing between the minimum and maximum times shown below after the batching time of the first truck load placed in the drilled shaft, unless otherwise accepted by the Engineer.

Shaft Diameter (inches)	Minimum time (hours)	Maximum time (hours)
36-48	24	54
49-60	24	72
61-72	24	72
73-84	24	90
85-120	24	108

The Contractor may propose modifications in the above table for site specific and special concrete mix conditions, as demonstrated from lab and field testing and instrumentation. The Engineer must approve all changes to the testing times prior to the Contractor using them.

Furnish information regarding the shaft, tube lengths and depths, construction dates, and other pertinent shaft installation observations and details to the Department at the time of testing. Verify access tube lengths and their condition in the presence of the Department, at the end of concrete placement. If the access tubes do not provide access over the full length of the shaft, repair the existing tube(s) or core additional hole(s), as directed by the Engineer, at no additional cost to the Department.

Just prior to inserting the thermal probe, remove water from the access tubes. Store the removed water in an insulated container for later replacement. Allow the thermal probe to acclimate in accordance with the equipment manufacturer recommendations. Continuously record temperatures at depth intervals of 3.0 inches or less from the top to the bottom of each access tube. Repeat the test at each access tube until two sets of data from the same access tube provide similar results. Return the warm water to the access tubes immediately after the testing has been completed.

Immediately report any potential defects indicated by lower temperature anomalies to the Engineer.

**455-17.6.1.3 Required TITDS Reports:** Submit the TITDS data and analysis to the Engineer in a signed and sealed report, together with all electronic data, within 48 hours of testing. The report shall include as minimum the following items:

1. Graphs displaying all temperature measurements and average temperature versus depth.
2. Indication of unusual temperatures, including cooler local deviations from the average at any depth from the overall average over the entire length.
3. A graph displaying the average temperature and theoretical temperature versus depth.
4. Variations in temperature between access tubes which may indicate variations in cage alignment.
5. The calculated radius of the shaft throughout the entire depth.
6. Alignment of the reinforcing cage along the shaft.
7. Calculated concrete cover throughout the entire depth.
8. Shaft Details, Probe Details, Environmental Details, Tube Run Selection and Shaft Adjustment Data that show the measurements, inputs and adjustments to the data. Screen captures of these pages from the "TIP Reporter" software will be acceptable.
9. A conclusion stating whether the tested shaft is free from integrity defects and meets the minimum concrete cover and diameter requirements by the

specifications. When anomalies are detected, include in the report a three dimensional rendering of the shape of the shaft.

**455-17.6.1.4 Evaluation of TITDS Test Results:** Drilled shafts not meeting the minimum cover and diameter requirements, or having integrity defects, are not acceptable without an engineering analysis.

**455-17.6.1.5 Coring and/or Repair of Drilled Shafts:** If a drilled shaft is unacceptable based on the TITDS tests and other testing, or problems observed during drilled shaft construction, core the shaft to allow further evaluation and repair, or replace the shaft. If coring to allow further evaluation of the shaft and repair is chosen, one or more core samples shall be taken from each unacceptable shaft for full depth of the shaft or to the depth directed by the GFDEOR. The GFDEOR shall determine, with concurrence of the Engineer, the number, location, and diameter of the cores based on the results of the TITDS. Keep an accurate log of cores. Properly mark and place the cores in a crate showing the shaft depth at each interval of core recovery. Deliver the cores to the GFDEOR and submit the coring log to the Engineer. Perform strength testing by an AASHTO certified lab on portions of the cores that exhibit questionable concrete as determined by the GFDEOR. If the TITDS and coring indicate the shaft is defective, propose remedial measures for approval by the Engineer. Such improvement may consist of, but is not limited to correcting defective portions of the shaft, providing straddle shafts to compensate for capacity loss, or providing a replacement shaft. Repair all detected defects and conduct post repair integrity testing using horizontal and offset CSL testing and 3-D tomographic imaging as described in 455-17.6.2. Engage a Specialty Engineer to perform gamma-gamma density logging calibrated to 1-1/2 inch black iron access tubes, prior to and after the repair is performed, to verify the integrity of the shaft outside the reinforcing cage in the same locations where the repair was required. When straddle shafts or replacement shafts are used to correct a deficient foundation perform TITDS in accordance with 455-17.6.1 through 455-17.6.3 to verify integrity of these shafts. Submit all results to the Engineer within five days of test completion for acceptance. Perform all work described in this sub-article at no additional cost to the Department, and with no increase in Contract Time.

**455-17.6.2 Cross Sonic Logging (CSL) and Tomography:** When required by the Engineer perform CSL testing in accordance with ASTM D6760. Engage a qualified Specialty Engineer to perform the CSL testing. The qualified CSL Specialty Engineer must be a Professional Engineer in the State of Florida and have a minimum six months experience of CSL testing, supervising the collection of CSL data and interpretation of CSL results. The individual performing the CSL testing in the field must work for the Specialty Engineer firm and have a minimum of six months experience of six months of CSL testing. The Contractor shall provide all necessary access and assistance to the CSL Specialty Engineer to satisfactorily perform the testing.

When a shaft contains four tubes, test every possible tube combination. For shafts with five or more tubes, test all pairs of adjacent tubes around the perimeter, and one-half of the remaining number of tube combinations, as chosen by the Engineer. Pull the probes simultaneously, starting from the bottoms of the tubes, over an electronic depth measuring device. Perform the CSL tests with the source and receiver probes in the same horizontal plane. Continuously record CSL signals at depth intervals of 2-1/2 inches or less from the bottom of the tubes to the top of each shaft. Remove all slack from the cables prior to pulling to provide accurate depth measurements in the CSL records. When the measurements indicate a 30% or greater reduction in velocity between one or more pairs take one or two concrete cores to allow

further evaluation and repair, or replace the shaft as directed by the Engineer. Determine the location of the concrete cores by performing 3D tomographic analysis using the CSL measurements. The core depths shall be at least 5 feet deeper than the bottom of the anomaly determined by the 3D tomography analysis or full depth if the anomaly is within 5 feet of the bottom of the shaft. The Engineer may accept a drilled shaft without rock cores if an EAR demonstrates that the anomaly does not affect the structural and the geotechnical axial capacity, the structural and geotechnical lateral stability, the settlement behavior of the shaft, and that the anomaly will not impact the durability of the foundation.~~perform 3D tomography analysis as indicated below.~~

~~To perform 3D tomography analysis conduct offset CSL measurements between the tube pair combinations in addition to the horizontal measurements. Record offset measurements with source and receiver vertically offset in the tubes. These measurements add four measurements per tube combination to the horizontal measurements described in this section. Offset measurements are described by the angle, in degrees, and direction the signal travels between the probes with respect to the horizontal plane: plus 45, plus 22.5 (source below receiver), and minus 45, minus 22.5 (source above receiver). Record offset measurements from the point where the higher probe is at least 5 feet below the velocity reduction to the point where the lower probe is at least 5 feet above the velocity reduction. When repairs are done, provide~~  
When repairs are done, perform CSL measurements in all tube pair combinations with the source and receiver running at the same horizontal plane and at vertical offsets of 45 degrees above and below. Perform all measurements including the offset measurements from the point where the higher probe is at least 5 feet below the lower limit of the repaired zone to the point where the lower probe is at least 5 feet above the upper limit of the repaired zone. Offset measurements must be as follows: plus 45 degrees (source below receiver) and minus 45 degrees (source above receiver). Use the measurements of these two offsets in combination with the horizontal measurements to perform the 3D tomography. Provide the CSL measurements, ~~Perform offset measurements and provide~~ CSL logs and 3D tomographic analysis at no additional cost to the Department.

After acceptance of production shafts by the Engineer, fill the tubes or core holes with a structural non-shrink grout in accordance with 455-17.6.1.

If the Contractor determines at any time during the non-destructive testing and evaluation of the drilled shaft that the drilled shaft should be replaced, no further testing or evaluation of that shaft is required.

**455-17.6.2.1 Required CSL Reports:** Present the CSL data and analysis results to the Engineer in a signed and sealed report. Include CSL logs with analyses of first pulse arrival time (FAT) versus depth and pulse energy/amplitude versus depth. Present a CSL log for each tube pair tested with any defect zones identified on the logs and discussed in the test report as appropriate. When offset measurements are required, perform 3D tomographic analysis using all offset data, and include color coded 3D tomographic images in the report.

**455-17.6.2.2 Evaluation of Cross-Hole Sonic Logging Testing:** Drilled shafts with velocity reduction exceeding 30% are not acceptable without an engineering analysis.

**455-17.6.2.3 Coring and/or Repair of Drilled Shafts:** If a drilled shaft is unacceptable based on the CSL Testing and tomographic analyses and other testing, core the shaft to allow further evaluation and repair, or replace the shaft in accordance with 455-17.6.1.5.

If repairs are performed or additional shafts installed to correct a

deficient foundation, conduct integrity testing and submit the results to the Engineer in accordance with 455-17.6.1.5.

#### **455-18 Method Shafts.**

The Engineer will use the construction of method shafts (test holes) to determine if the methods and equipment used by the Contractor are sufficient to produce a shaft excavation meeting the requirements of the Contract Documents. During method shaft excavations, the Engineer will evaluate the ability to control dimensions and alignment of excavations within tolerances; to seal the casing into impervious materials; to control the size of the excavation under caving conditions by the use of slurry or by other means; to properly clean the completed shaft excavation; to construct excavations in open water areas; to determine the elevation of ground water; to place reinforcing steel and concrete meeting the requirements of these Specifications within the prescribed time frame; and to execute any other necessary construction operation. Revise the methods and equipment as necessary at any time during the construction of the method shaft when unable to satisfactorily carry out any of the necessary operations described above or when unable to control the dimensions and alignment of the shaft excavation within tolerances.

Successfully construct method shafts out of permanent position at the location shown in the Plans. Ensure the diameter and depth of the method shafts are the same diameter and maximum depth as the production drilled shafts. When there are shafts both on land and in water, successfully construct a method shaft for each condition. When there is more than one size of drilled shaft, perform a method shaft for the largest diameter for each condition. Reinforce the method shaft unless otherwise directed in the Contract Documents. Conduct integrity tests on each shaft, using both cross-hole sonic logging and TITDS test methods. Fill the method shaft with concrete in the same manner production drilled shafts will be constructed. Backfill method shafts which are not filled with concrete with suitable soil in a manner satisfactory to the Engineer. Leave concreted method shafts in place, except remove the top of the shaft to a depth of 2 feet below the ground line. Use the same procedure for shafts constructed in water. Restore the disturbed areas at the sites of method shafts drilled out of position as nearly as practical to their original condition. When the Contractor fails to demonstrate to the Engineer the adequacy of his methods or equipment, and alterations are required, make appropriate modifications and provide additional method shafts at no expense to the Department. Make no changes in methods or equipment after initial acceptance without the consent of the Engineer.

A separate method shaft is not required for drilled shafts installed under sign, signal, lighting and ITS structures. The first production shaft will serve as a method shaft for determining acceptability of the installation method.

#### **455-19 Test Bells.**

Test bells are no longer used.

#### **455-20 Construction Tolerances.**

Meet the following construction tolerances for drilled shafts:

1. Ensure that the top of the drilled shaft is no more than 3 inches laterally in the X or Y coordinate from the position indicated in the Plans.
2. Ensure that the vertical alignment of the shaft excavation does not vary from the alignment shown in the Plans by more than 1/4 inches per foot of depth.



3. After placing all the concrete, ensure that the top of the reinforcing steel cage is no more than 6 inches above and no more than 3 inches below plan position.

4. Ensure that the reinforcing cage is concentric with the shaft within a tolerance of 1-1/2 inches. Ensure that concrete cover is a minimum of 4-1/2 inches unless shown otherwise in the Plans.

5. All casing diameters shown in the Plans refer to I.D. (inside diameter) dimensions. However, the Contractor may use casing with an outside diameter equal to the specified shaft diameter if the extra length described in 455-15.7 is provided. In this case, ensure that the I.D. of the casing is not less than the specified shaft diameter less 1 inch. The Contractor may elect to provide a casing larger in diameter than shown in the Plans to facilitate meeting this requirement. Ensure that the minimum diameter of the drilled shaft is 1 inch less than the specified shaft diameter. When conditions are such that a series of telescoping casings are used, provide the casing sized to maintain the minimum shaft diameters listed above.

6. Except when a butting or encroaching within a sidewalk, ensure that the top elevation of the drilled shaft concrete has a tolerance of plus 1 inch and minus 3 inches from the top of shaft elevation shown in the Plans.

7. When abutting or encroaching within a sidewalk, ensure that the top elevation of the drilled shaft is flush with the sidewalk surface.

8. The dimensions of casings are subject to American Petroleum Institute tolerances applicable to regular steel pipe.

9. Use excavation equipment and methods designed so that the completed shaft excavation will have a flat bottom. Ensure that the cutting edges of excavation equipment are normal to the vertical axis of the equipment within a tolerance of plus or minus 3/8 inches per foot of diameter.

#### **455-21 Drilled Shaft Excavations Constructed out of Tolerance.**

Do not construct drilled shaft excavations in such a manner that the concrete shaft cannot be completed within the required tolerances. The Contractor may make corrections to an unacceptable drilled shaft excavation by any combination of the following methods:

1. Overdrilling the shaft excavation to a larger diameter to permit accurate placement of the reinforcing steel cage with the required minimum concrete cover.

2. Increasing the number and/or size of the steel reinforcement bars.

When the tolerances are not met, the Contractor may propose a redesign to incorporate shafts installed out of tolerance into caps or footings. Incorporate shafts installed out of tolerance at no expense to the Department. Ensure the Contractor's Engineer of Record performs any redesign and signs and seals the redesign drawings and computations. Do not begin any proposed construction until the redesign has been reviewed and accepted by the Engineer.

Backfill any out of tolerance shafts in an accepted manner when necessary until the redesign is complete and accepted. Furnish additional materials and work necessary, including engineering analysis and redesign, to effect corrections of out of tolerance drilled shaft excavations at no expense to the Department.

#### **455-22 Recording, Certification and Verification.**

**455-22.1 Recording:** Inspect and record all the drilled shaft operations. Keep a set of drilled shaft logs for each drilled shaft including test holes, load test shafts and production shafts. Use the Department's Drilled Shaft Log forms to record the information. Submit to the Engineer drilled shaft logs and concrete logs within 24 hours of concrete placement. The documentation

shall include the drilled shaft installation procedures, actual dimensions and quantities of the materials used, fluid testing results, bottom cleanliness inspection results, sequencing, as well as any problems encountered during construction and concrete placement. Allow two working days, excluding weekends and Department observed holidays, for the Department to review the data and determine whether shafts will be selected for CSL integrity testing. Perform CSL testing on any shaft selected by the Department at this stage in accordance with 455-17.

**455-22.2 Foundation Certification Packages:** Submit certification packages of drilled shaft foundations to the Engineer prior to Verification Testing. Each Foundation Certification Package shall include a letter signed and sealed by the GFDEOR certifying the drilled shafts have the required axial capacity, torsional capacity, uplift capacity, overturning and lateral stability, integrity deficiencies have been corrected, settlements will not affect the functionality of the structure, and that the inspection of the drilled shaft installation was performed under the supervision of the GFDEOR. Include all shaft excavation and concreting logs, videos of visual shaft bottom inspections, all CSL reports and electronic data, gamma-gamma testing reports, slurry test data, supplemental testing data, analyses for the foundation unit and the concrete strength test results of the lots sampled. The certification shall not be contingent on any future testing or approval by the Engineer. Submit a separate Foundation Certification Package for each foundation unit. A foundation unit is defined as all the shafts within one bent or pier for a specific bridge for each phase of construction. For sign, signal, lighting and ITS structures, a foundation unit is defined as all the shafts within one intersection/interchange, for each phase of an intersection/interchange or all the shafts included in the structure.

**455-22.3 Verification:** The Engineer reserves the right to observe and perform verification testing on any drilled shafts during any phases of the foundation operation.

Provide safe access and cooperate with the Engineer for verification of the drilled shafts, both during construction of shafts and after submittal of the certification package. The Engineer may verify the bottom cleanliness by over the shoulder review of the Contractor's visual inspection methods and/or by independent means. The Engineer may verify properties of drilling fluid at the time of concreting.

Within one working day, excluding weekends and Department observed holidays, of receipt of the Foundation Certification Package, the Engineer will examine the Certification Package and determine whether shafts in that foundation unit will be selected for Verification Testing. The Engineer may select every shaft for Verification Testing if defects are suspected, or choose not to require verification testing on any or all foundation units. The Engineer will provide equipment and personnel as needed for Verification Testing. Methods used for Verification Testing of a completed shaft are at the discretion of the Engineer and may include coring, cross-hole sonic logging, gamma-gamma density logging, low-strain dynamic integrity testing, or other methods.

After Verification Testing for a foundation unit is performed, the Engineer will provide the results within five working days, excluding weekends and Department observed holidays. Integrity testing access tubes shall not be grouted and construction of footings, caps, columns or any superstructure elements shall not occur until the Engineer has notified the Contractor that additional Verification Testing is not required.

If any shaft is found to be deficient, correct the deficiency (i.e. repair or replace the shaft) and/or modify the design to compensate for the deficiency. After the deficiency is corrected, retest and recertify the shaft. The Engineer may then perform additional Verification

Testing. In case of disagreement of test results, the Engineer's results will be final and used for determination of acceptance.

ARTICLE 455-23 is deleted:

**455-24 Basis of Payment.**

Contract Price includes all labor, equipment and materials required for furnishing, installing, and certifying drill shaft foundations, in place and accepted. No separate payment will be made for any items of work associated with construction of drill shaft foundations.

**D. SPREAD FOOTINGS**

**455-25 Description.**

Construct reinforced concrete spread footing foundations, including dewatering when necessary, excavating to the required limits, compacting the underlying soil as required, and constructing seals when required.

**455-26 General Requirements.**

Meet the following requirements for all spread footings:

1. Perform excavations, including the removal of all material, of whatever nature, necessary for the construction of spread footings. As used herein, the term "soil" shall constitute any material, whether soil, rock, or other materials.
2. Slope excavations as required, or support them with sheeting, and shore them if necessary, to provide a safe excavation that is adequate for construction purposes and that will adequately protect any existing adjacent structures.
3. Ensure that the foundation soils are firm, stable, and meet or exceed the design bearing and compressibility requirements before constructing the footings or any required seals. The Department may elect to use any type of tests to evaluate the foundation soils that is appropriate in the opinion of the Engineer. Cooperate with the Engineer in the evaluation of the foundation soils, and assist the Engineer as necessary to provide access to the site.
4. Modify the elevation of the bottom of footings or seals and the depth of over-excavation shown in the Plans as may be necessary to secure a satisfactory foundation.
5. Place all spread footing concrete in the dry.

Provide safe access and cooperate with the Engineer to perform verification of the spread footing construction.

**455-26.1 Foundation Certification Packages**

Submit two copies of a letter signed and sealed by the GFDEOR to the Engineer certifying each spread footing has the required axial, lateral and torsional capacity, overturning stability and integrity; and settlement will not affect the functionality of the structure. A separate Foundation Certification Package must be submitted for each foundation unit. A foundation unit is defined as a spread footing. Spread footings must be certified and the certification accepted before continuing with the construction of any structural element above the foundation unit. Correct all integrity problems and non compliance issues prior to submitting the certification packages. The certification shall not be contingent on any future testing or approval by the Engineer.

Within one working day, excluding weekends and Department observed holidays, after receipt of the Foundation Certification Package, the Engineer will examine the records and determine the acceptability of the shallow foundation.

**455-27 Monitor Existing Structures.**

Monitor existing structures in accordance with Section 108.

**455-28 Dewatering.**

The Contractor is responsible for the design, installation, and operation of an adequate dewatering system to dewater excavations for spread footings. Use a well point or well system. Submit a dewatering plan to the Engineer for his records before beginning construction.

Use well points or wells where the piezometric water level is above an elevation 3 feet below the bottom of the excavation. Maintain the water table 3 feet or more below the maximum depth of excavation. Provide continuous dewatering until completing construction of the footing and backfill the excavation at least 3 feet above the piezometric water table elevation. In the event of a dewatering failure, determine the effects of such a failure on the foundation soils, and take whatever corrective measures are required at no additional expense to the Department. When discontinuing dewatering, decrease the rate of pumping, allowing the water level to rise slowly. Use a rate, in feet per hour, that the water table is allowed to rise equal to the total number of feet the water table was lowered, divided by ten hours or a rate of 1 foot per hour, whichever is less.

Install one piezometer well approximately every 15 feet of footing perimeter. Provide a minimum of two piezometers at locations within 2 feet from the outside of the footing perimeter. Install piezometer wells to a depth at least 10 feet below the bottom of footing elevation. Measure water elevation in the piezometer wells prior to excavation and at 12-hour intervals between excavation and discontinuation of dewatering. Maintain the piezometers in working condition throughout the dewatering process, and repair or replace them when damaged at no expense to the Department.

**455-29 Excavations**

If the excavation must be carried deeper than shown in the Plans to obtain a satisfactory foundation, revise the Plans.

**455-29.1 Dry Excavations:** Dry excavations are excavations that can be completed without the need to lower the piezometric water level. Perform dry excavations when the piezometric water level at the time of construction is and, in the opinion of the Engineer, will remain at least 3 feet below the bottom of the authorized excavation or over-excavation. Demonstrate to the Engineer that a stable excavation can be made without dewatering. Make adequate provisions to divert surface runoff and to collect and remove any water entering the excavation.

Excavate to the bottom of footing, to the over-excavation limits shown in the Plans or as required for forming. Save any suitable materials for backfill. Provide areas for the disposal of all unsuitable materials, and dispose of them in a satisfactory method. Compact the foundation soils below the footing as described herein before constructing the footing.

**455-29.2 Dewatered Excavations:** Dewatered excavations are excavations made after first lowering the piezometric water level with wellpoints or wells. Perform dewatering as described in 455-28. Excavate in the dry after lowering of the water table.

When dewatering is required, the Contractor may excavate within 3 feet of the ground water table before dewatering begins if the dewatering system is operating and the Contractor has demonstrated that the water level has been lowered to and maintained at acceptable limits. Where large excavations require stage lowering of the water table (additional wellpoint systems installed at lower elevations), the Contractor may continue excavating as long as the water elevation is maintained at least 3 feet below the excavation.

Ensure that surface runoff is diverted from the excavation. Compact the foundation soils as shown in the Plans or as described herein before constructing the footing.

**455-29.3 Wet Excavations:** Wet excavations are excavations made below the existing water table without prior dewatering. When the Plans show a cofferdam and seal, perform the excavation in the wet. Maintain the water level during excavation at or above the water level outside the cofferdam.

Place the seal directly upon the foundation soils or rock when using wet excavations. Do not compact foundation soils for wet excavations. Ensure that the foundation soils or rock are disturbed as little as practical. Remove all loose or disturbed materials before placing the seal concrete.

#### **455-30 Fill or Backfill.**

In all excavations, including over-excavations below the footing, use only fill or backfill materials considered Select in accordance with Standard Plans, Index 120-001. Ensure the material is free of rubble, debris, or rocks that would prevent uniform placement and compaction. Ensure the material below the top of the footing is free of Recycled Asphalt Pavement (RAP). Perform sampling and testing in accordance with 120-10.1.4, except replace FM 1-T99 with FM 1-T180,.

#### **455-31 Compaction and Density Requirements.**

Compact the bottom of the excavation with suitable equipment. Compact the soil beneath footing excavation (whether dug to the bottom of footing or over-excavated) to a density not less than 95% of the maximum density as determined by FM 1-T180 for a minimum depth of 2 feet below the bottom of the excavation or to the depth shown in the Plans before backfilling begins. For every 500 feet of excavation or isolated compaction operation, perform two Quality Control (QC) density tests with a 12 inch depth of measurement: one QC density test with the gauge placed at an elevation of 1 foot below the bottom of the excavation and one QC density test with the gauge placed at the bottom of the excavation in accordance with FM 1-T238. Compact the backfill in footing excavations which have been over-excavated to a density not less than 95% of the maximum density as determined by FM 1-T180. Ensure that the maximum lift thickness after compaction does not exceed 6 inches. For every 500 feet of backfill or isolated compaction operation, perform at least one QC density test. The Engineer will conduct one density verification test per every four QC test with a minimum of one density test below the bottom of the excavation and one density test in the backfill. Verification comparison criteria and resolution procedures will be in accordance with 120-10.4 except replace FM 1-T99, with FM 1-T180.

For compaction, use a suitable heavy vibratory roller with a static drum weight of at least 4 tons. Compact each lift to the required density. Also, compact the final lift below the footing with a suitable sled vibratory compactor to remove any upper disturbance caused by the drum roller. When conditions require use of smaller compaction equipment, obtain the Engineer's acceptance for the equipment, and reduce the lift thickness to achieve the required density.

Perform backfilling to the original ground surface, finished grade, or subgrade as required by the Plans in the immediate vicinity by suitable mechanical compactors weighing less than 1,000 pounds. The Contractor may compact backfill located more than 15 feet away from the exterior periphery of the footing with heavier compactors. Do not place backfill on the footing until the Engineer has given permission and until the concrete is at least seven days old.

When the plans indicate spread footing abutments on mechanically stabilized earth (MSE) walls, place and compact the backfill material underneath the footing in accordance with the requirements of 548-8.5. Meet the density requirements of 548-9.4.

**455-32 Forming.**

Form spread footings if it cannot be demonstrated that the natural soil or rock is strong enough to prevent caving during construction. For forms, meet the applicable requirements of 400-5. When forms are not required, meet the requirements of 400-5.4.4.

**455-33 Materials.**

**455-33.1 Concrete:** Meet the requirements of Section 346.

**455-33.2 Reinforcing Steel:** Meet the requirements of Section 415. For spread footing reinforcing steel, use Grade 60.

**455-34 Reinforcing Steel Placement.**

Place and fasten reinforcing steel for footings according to the applicable provisions of 415-5.

**455-35 Concrete Placement.**

**455-35.1 Placement:** Place all footing concrete in the dry and according to the applicable provisions of Section 400. Do not construct joints in footings.

**455-35.2 Finish:** After placing and consolidating the concrete, strike-off the top surface to the grades shown in the Contract Documents, leaving the surface smooth and free of undesirable cavities and other defects. Do not provide a special finish unless the footing will be visible after construction, in which case, meet the applicable provisions of Section 400.

**455-35.3 Curing:** Provide continuous-moisture-curing for footings. For cover materials, use clean sand, sawdust, or other materials accepted by the Engineer. Continuously wet the cover materials for a period of 72 hours.

ARTICLE 455-36 is deleted:

**455-37 Basis of Payment.**

Contract Price includes all labor, equipment and materials required for furnishing, installing, and certifying the completed foundations, in place and accepted. No separate payment will be made for any items of work associated with spread footing construction.

**E. STRUCTURES (OTHER THAN BRIDGE)  
FOUNDATIONS-AUGER CAST PILES**

**455-38 Description.**

Furnish and install auger cast piles (ACP) or augered cast-in-place (ACIP) piles used for structural support, other than bridge foundations.

ACP piles are defined as a foundation made by rotating a hollow-stem auger into the ground to the required pile depth with sufficient crowd (downward thrust) to prevent mining of the soil. A fluid cement grout is injected through the auger shaft under continuous positive pressure as the auger is being withdrawn. A reinforcing steel cage, as specified, is inserted into the column of fluid grout following the completion of grout placement.

**455-39 General Requirements.**

**455-39.1 Contractor's Operations:** Submit an Auger Cast Pile Installation Plan in accordance with 455-47. Prior to the start of production piles, demonstrate to the satisfaction of the Engineer, the dependability of the equipment, techniques, and source of materials by construction of a demonstration pile.

Provide safe access and cooperate with the Engineer to perform verification of the auger cast pile installation.

**455-39.2 Monitor Existing Structures:** Monitor existing structures in accordance with Section 108.

**455-40 Materials.**

Meet the following material requirements:

Portland Cement and Blended Cement .....	Section 921
Supplementary Cementitious Materials .....	Section 929
Fine Aggregate (Sand)* .....	Section 902
Admixtures .....	Section 924
Water .....	Section 923
Fluidifier** .....	ASTM C 937
Reinforcing Steel .....	Section 415

\* The Engineer will only permit Silica Sand except as provided in 902-5.2.3.

\*\* The fluidifier shall not contain chlorides.

**455-41 Grout Mix Proportions.**

Use a grout mix consisting of a mixture of cementitious materials, admixtures, sand and water. Proportion and mix to produce a grout capable of maintaining the solids in suspension without appreciable bleed water which may be pumped without difficulty and fill open voids in the adjacent soils and rock. The grout mix may include a fluidifier used in accordance with the manufacturer's technical representative. Proportion these materials to produce a hardened grout of the required strength.

**455-42 Mixing and Pumping Cement Grout.**

Meet the following requirements:

1. Only use pumping equipment accepted by the Engineer in the preparation and handling of the grout. Before using the mixers, remove all oil or other rust inhibitors from the mixing drums, stirring mechanisms, and other portions of the equipment in contact with the grout.

2. Use a quantity of water and mixing time that will produce a homogenous grout having an efflux of not less than 21 seconds, when tested with a flow cone in accordance with ASTM D6449. Reject loads with efflux of less than 21 seconds. Notify the production facility to adjust the mix design. Calibrate the flow cone in accordance with ASTM D6449. Conduct the

calibration initially before its first use and as directed by the Engineer, when there is a question of the flow cone's accuracy.

Technicians performing the efflux test must take the Auger Cast Pile course and pass the final examination to be qualified to test for any auger cast pile installations in the field. Assist the Engineer in verifying the technicians meet these requirements.

Conduct test for efflux time at the beginning of each day's grouting operation and as directed by the Engineer to ensure the Specification requirements are met.

3. Mix the grout at least one minute. If agitated continuously, the grout may be held in the mixer or agitator for a period not exceeding 2.5 hours at grout temperatures below 70°F; two hours for temperatures from 70°F to 100°F. Do not place grout when its temperature exceeds 100°F. If there is a lapse in the operation of grout injection, recirculate the grout through the pump, or through the mixer drum or agitator.

4. Use mixers capable of combining components into a thoroughly mixed and uniform mass, free from balls or lumps and capable of discharging the grout with a satisfactory degree of uniformity. The Engineer's acceptance of grout mixers and all other equipment will be contingent on proper performance during construction of the demonstration pile and subsequent production work.

5. Use a screen no larger than 3/4 inch mesh between the mixer and pump to remove large particles which might clog the injection system.

6. Use a positive displacement piston type grout pump equipped with a pressure gauge, capable of developing displacing pressures at the pump not less than 350 psi. The pump must be appropriately sized to the pile diameter. Provide a grout pressure gage in clear view of the equipment operator. Provide a second pressure gauge near the drill rig where it can be observed by the Engineer.

7. Accurately monitor the volume and pressure of the grout flow. Provide a pump stroke counter in good working condition on the grout pump. Perform a calibration test of the pumping equipment, prior to construction of the demonstration piles, to determine the average volume of grout for every pump stroke, in accordance with FM 5-612. When the Contractor's installation procedure includes priming the grout pump, grouting lines or auger conduit after drilling the hole, perform a priming demonstration to determine the minimum number of pump strokes required to deliver fresh grout throughout the entire system and flow from the grout injection hole at the bottom of the auger. Perform this grout priming demonstration prior to any calibration test.

The Engineer may require additional pump calibrations and priming demonstrations when the pump is repaired, a different pump is used, when the length of the grout lines or hollow auger lengths increase from previous piles for which priming demonstrations were performed and at any time the Engineer determines the grout pump performance may have changed.

#### **455-43 Testing Cement Grout.**

Prepare three 4 inches x 8 inches cylinders for each LOT in accordance with ASTM C31, except pour grout in a single lift into cylinders molds without rodding. Plastic properties in accordance with ASTM C31 are not required. A LOT is defined as the lesser of 50 cubic yards of cement grout placed or one day of pile placement. Prepare three additional QC "hold" cylinders on the LOT selected by the Engineer for Verification. Provide curing facilities for all QC and Verification test cylinders in accordance with ASTM C31. Test the cylinders at 28 days, in accordance with ASTM C39.



When one of the three QC cylinders from a LOT is lost, missing, damaged or destroyed, determination of compressive strength will be made by averaging the remaining two cylinders. If more than one QC cylinder from a LOT is lost, missing, damaged or destroyed, core the structure at no additional expense to the Department to determine the compressive strength. Acceptance of LOT may be based on verification data at the discretion of the Engineer. Obtain the approval of the Engineer to core, and of the core location prior to coring. Repair core holes after samples are taken with a product meeting the approval of the Engineer, at no additional cost to the Department.

For each QC cylinder that is lost, missing, damaged or destroyed, payment for that LOT will be reduced by \$750.00 per 1,000 psi of the specified design strength [Example: For  $f'_c=5,500$  psi, and the loss of two auger cast pile grout QC cylinders that have no verification data will require the element to be cored and a pay reduction will be assessed ( $5,500$  psi /  $1,000$  psi)  $\times$   $\$750 \times 2 = \$8,250$ ]. This reduction will be in addition to any pay adjustment for low strength.

The Engineer will cast three verification cylinders and three “hold” cylinders from one of every four consecutive Lots, randomly selected. The Engineer will compare QC and Verification results in accordance with Section 346. If the results do not compare, the Engineer will initiate a Resolution Investigation in accordance with Section 346

Personnel making/curing grout cylinders shall be certified as ACI Concrete Field Testing Technician Grade I. Personnel performing tests on hardened properties of grout, such as strength determination of cylinders or beams, shall be certified as ACI Concrete Strength Testing Technician.

All low strength cement grout accepted by the Engineer will be subject to reduced payment as follows: \$0.80 per cubic yard for each 10 psi of strength test value below the specified minimum strength. The Engineer will use the average compressive strength of the LOT tests for the computation of this pay reduction.

The Engineer will compute the volume of grout for which the reduction will be applied as 115% of the theoretical volume of the auger cast pile diameter required in the Contract Documents. Reduction in pay will be applied to the entire length of all piles containing low strength cement grout, in any quantity. The quantity of cement grout affected by the payment reduction may exceed the quantity of cement grout contained in the LOT.

When a cement grout acceptance strength test falls more than 500 psi below the specified minimum strength, perform one of the following:

1. Remove and replace the piles affected fully or partially by the low strength LOT at no additional cost to the Department, or
2. Submit a structural analysis performed by the Contractor’s Engineer of Record. If the results of the analysis, approved by the Department, indicate adequate strength to serve the intended purpose with adequate durability, the concrete may remain in place.

Otherwise, abandon and install additional piles to the foundation, or remove and replace the piles affected fully or partially by the low strength LOT of grout at no additional cost to the Department. When installing additional piles to resolve the strength deficiency, submit a foundation redesign to add piles into pile caps or footings, at no expense to the Department in accordance with 455-46.

#### **455-44 Pile Installation.**

Meet the following requirements:

1. Locate the piles as shown on the drawings.

2. Should soft, compressible muck, organics, clay or other unsuitable materials (non A-1, A-3, A-2-4 or limestone materials) be encountered, remove the unsuitable material to a maximum depth of 5 feet and a radial distance around the pile centerline of two pile diameters unless otherwise indicated in the Plans. Backfill with clean granular backfill materials (A-1, A-3, A-2-4), placed and compacted in maximum 12 inch lifts to at least 95% of maximum dry density as determined by FM 1-T180. Complete this work to the Engineer's satisfaction prior to ACP construction. Should more than 5 feet depth or excessive quantities of unsuitable material be encountered, submit a revised design to the Engineer for review and acceptance prior to proceeding with pile construction.

3. Provide continuous auger flighting from the bottom of the pile to the top of ground at the time of drilling with no gaps or other breaks except for connections. Ensure the auger flights are uniform in diameter throughout its length, and of the diameter specified for the piles less a maximum of 3%. Provide augers with a distance between flights of approximately half the diameter of the auger.

4. Use augers with the grout injection hole located at the bottom of the auger tip below the cutting teeth, and with pile auger leads containing a bottom guide.

5. Construct piles of the length and diameter shown on the Plans.

6. Clearly mark the auger leads to facilitate monitoring of the incremental drilling and grout placement. Provide individual foot marks with 5 foot increments highlighted and clearly visible. Provide a clear reference mark on the moving auger assembly to facilitate accurately monitoring the vertical movement of the auger.

7. Place piles by rotating a continuous flight hollow shaft auger into the ground at a continuous rate that prevents removal of excess soil. Stop advancement after reaching the predetermined depth.

8. Should auger penetration to the required depth prove difficult due to hard materials/refusal, the pile location may be predrilled, upon concurrence by the GFDEOR and acceptance of the Engineer, through the obstruction using appropriate drilling equipment, to a diameter no larger than 1/2 the prescribed finish diameter of the ACP. Commence ACP construction immediately upon completion of predrilling to minimize ground loss and soil relaxation.

9. Plug the injection hole at the bottom of the auger prior to advancing into the ground.

10. Pump the grout with sufficient pressure as the auger is withdrawn to completely fill the auger hole, preventing hole collapse and to cause the lateral penetration of the grout into soft or porous zones of the surrounding soil or rock. Prior to commencing withdrawal of the auger, establish a head of at least 5 feet of grout by pumping a volume of grout equivalent to 5 feet of pile volume. Do not include the volume or strokes required to prime the grout pumping system in the volume required to build this initial head. Maintain this head of at least 5 feet of grout above the injection point around the perimeter of the auger to displace and remove any loose material from the hole. Maintain positive rotation of the auger at least until placement of the grout.

11. Once the grout head has been established, greatly reduce the speed of rotation of the auger and commence extraction at a rate consistent with the pump discharge. Maintain extraction at a steady rate to prevent a locked-in auger, necking of the pile, or a substantially reduced pile section. Ensure grout starts flowing out from the hole when the cutting head is at least 5 feet below the ground surface. Place a minimum volume of grout in the hole of at least

115% of the column of the auger hole from a depth of 5 feet to the tip. Place a minimum volume of grout in the hole of at least 105% of the column of the auger hole from the ground surface to a depth of 5 feet. Do not include any grout needed to create surplus grout head in the volume of grout placed into the hole. If the grout does not flow out from the hole when the cutting head is at least 5 feet below the ground surface, redrill the pile. If grouting is interrupted for any reason, reinsert the auger by drilling at least 5 feet below the tip of the auger when the interruption occurred, and then regrout.

Use this method of placement at all times. Do not depend on the stability of the hole without the earth filled auger.

12. Assume responsibility for the grout volume placed. If less than 115% of the theoretical volume of grout is placed in any 5 foot increment (100% in the top 5 foot increment), redrill 10 feet below that increment, or to the tip of the pile, whichever is less and resume pumping, followed by controlled removal and grout injection.

13. Furnish and install the reinforcing steel and anchoring bolts as shown in the Contract Documents. Use wheels or other approved noncorrosive spacing devices within 3 feet of the bottom, within 3 feet of the top, and intervals not exceeding 10 feet along the pile to ensure concentric spacing for the entire length of the cage. Do not use block or wire type spacers. Use a minimum of one spacer per 30 inches of circumference or perimeter of cage with a minimum of three at each level.

14. Use reinforcement that is without kinks or nonspecified bends, free of mud, oil or other coatings that could adversely affect the bond. Make splices in reinforcement as shown on the Contract Documents, unless otherwise accepted by the Engineer. Place the required steel reinforcement while the grout is still fluid, and immediately after finishing grouting and clearing it from any contaminating material. Install the steel cage into the grout by its own weight or manually. Do not use a mechanical equipment or tool to impact the steel cage or to force it into the grout. If the steel cage cannot be placed completely following this procedure, remove the cage, redrill and regrout the pile.

15. Leave any temporary supports of/for items placed into a grouted pile (reinforcement template, anchor bolt template, precast column supports, etc.) in place for a minimum of 12 hours after completion of the pile. Do not place wall panels or other significant loads, before the grout has set a minimum of seven days or reached the 28 day strength.

#### **455-45 Construction Tolerances.**

Locate piles as shown on the Plans. Locate pile centers to an accuracy of plus or minus 3 inches. Ensure that the top of pile elevation is within plus or minus 3 inches of the Plan elevation. Ensure the tolerances of 534-5.1 can be met.

#### **455-46 Unacceptable Piles.**

Repair or replace unacceptable piles and/or modify the design to compensate for the deficiency at no cost to the Department. Unacceptable piles are defined as piles that fail for any reason, including but not limited to the following: piles placed out of position or to improper elevation; piles with reduced cross section, contaminated grout, lack of grout consolidation (honeycombed), or deficient grout strength; and piles with reinforcement, anchor devices or other components cast or placed into the fluid grout out of position. When the Engineer determines that a pile is unacceptable, the Contractor may propose a foundation redesign to add piles to the foundation, at no expense to the Department. The Contractor's Engineer of Record must perform any redesign, and sign and seal the redesign drawings and calculations. Do not

begin any proposed construction until the redesign has been reviewed and approved by the Engineer.

**455-47 Auger Cast Pile Installation Plan (ACPIP).**

No later than 15 days before ACP construction begins, submit the ACP/IP for acceptance by the Engineer. The ACP/IP shall govern all ACP construction activities. In the event that deviations from this installation plan are observed, the Department may perform Independent Verification Testing/Review of the Contractor's equipment, procedures, personnel and ACP construction at any time during ACP construction. If, as determined by the Department, construction equipment, procedures and/or personnel is deemed inadequate to consistently provide auger cast piles meeting the contract requirements, the Contractor's ACP/IP acceptance may be withdrawn pending corrective actions. All ACP construction activities shall then cease and not restart until corrective actions have been taken and the ACP/IP has been re-accepted.

Provide the following detailed information on the ACP/IP:

1. Name and experience record of ACP superintendent or foreman in responsible charge of ACP operations. Place a person in responsible charge of day to day ACP operations meeting the experience requirements of 105-8.13 constructing ACP similar to those described in the Contract Documents. The Engineer will give final acceptance subject to satisfactory performance in the field.
2. List and size of the proposed equipment, including cranes, augers, concrete pumps, mixing equipment etc.
3. Details of grout mixing procedures and proposed pump calibration procedures.
4. Details of pile installation methods.
5. Details of reinforcement placement and method of centering in pile, including details of all temporary supports for reinforcement, anchor bolts, precast columns, etc.
6. Details of how and by whom the grout volumes will be determined, monitored and documented.
7. Required submittals, including shop drawings and cement grout design mixes.
8. Equipment and procedures for visual inspection, and any methods to identify and remediate auger cast pile deficiencies.
9. Name of the inspectors assigned to monitor the installation of the auger cast piles, including evidence of the inspectors having taken and passed the CTQP computer based training course for auger cast piles.
10. Other information requested by the Engineer.
11. A letter from the GFDEOR certifying concurrence with the ACP/IP.

The Engineer will evaluate the ACP/IP for conformance with the Contract Documents. Within five working days after receipt of the plan, excluding weekends and Department observed holidays, the Engineer will notify the Contractor of any comments and additional information required and/or changes that may be necessary to satisfy the Contract Documents. The Engineer will reject any part of the plan that is unacceptable. Submit changes agreed upon for reevaluation. The Engineer will notify the Contractor within two working days, excluding weekends and Department observed holidays, after receipt of proposed changes of their acceptance or rejection. All equipment and procedures are subject to trial and satisfactory performance in the field. Acceptance by the Engineer does not relieve the Contractor of the responsibility to perform the work in accordance with the Contract Documents. The Engineer's acceptance is not a guarantee that the chosen methods and equipment are capable of obtaining the required results, this responsibility lies with the Contractor.

**455-48 Inspection and Records.**

Monitor and record pile installation utilizing the most recent version of the Department Auger Cast-In-Place Pile Installation Record form.

ARTICLE 455-49 is deleted:

**455-50 Basis of Payment.**

Contract Price includes cost of all labor, equipment and materials required for furnishing, installing, and certifying the completed auger cast pile foundations, in place and accepted. No separate payment will be made for any items of work associated with auger cast pile construction.

**455-51 Foundation Certification Packages**

Submit two copies of a letter signed and sealed by the GFDEOR to the Engineer certifying each foundation unit has the required axial capacity, lateral stability and integrity, settlements will not affect the functionality of the structure, and that the inspection of the auger cast pile installation was performed under the supervision of the GFDEOR. A separate Foundation Certification Package must be submitted for each foundation unit. The foundation unit is defined as a group of piles per wall segment or per full wall. Every ACP must be certified and the certification accepted before continuing with the construction of any structural element over the foundation unit. Each Foundation Certification Package shall include all ACP logs, the Department spreadsheet properly completed for every ACP and the grout strength test results of the lots sampled. Correct all integrity problems and noncompliance issues prior to submitting the certification packages. The certification shall not be contingent on any future testing or approval by the Engineer. Within three working days, excluding weekends and Department observed holidays, after receipt of the Foundation Certification Package, the Engineer will examine the records and determine the acceptability of the auger cast piles. The Engineer will reject any certification package that is incomplete or indicates noncompliance with the specifications without the issue being corrected to the satisfaction of the Engineer.

If any ACP is found to be deficient, correct the deficiency (i.e. repair or replace the ACP) and/or modify the design to compensate for the deficiency. In case of disagreement of test results, the Engineer's results will be final and used for determination of acceptance.

After meeting the time requirements of 455-44(15), the Contractor may place panels prior to a complete submittal of the Certification Package at their own risk. If the Engineer determines that verification testing is needed, the Contractor will perform all work and provide all labor, at no additional cost to the Department, necessary to allow access to the piles requiring verification. Replace or redesign and reconstruct, to the satisfaction of the Engineer, any foundation found to be unacceptable after submittal of the certification packages or after verification testing, at no cost to the Department.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 13, 2020

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **475**  
Proposed Specification: **SP4750000DB Value Added Bridge Components (Design Build)**.

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Larry Ritchie from the State Construction Office to remove the existing Developmental Specification 457 and incorporate the language as a Design-Build Special Provision.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**VALUE ADDED BRIDGE COMPONENTS.****(REV ~~13-818-2115~~)**

The following new Section is added after Section 471.

**SECTION 475****VALUE ADDED BRIDGE COMPONENTS****475-1 Description.**

Construct Value Added Bridge Components (VABC), when included in the Contract, consisting of those features provided for in the Design and Construction Criteria and/or the Technical Proposal and subject to a Materials and Workmanship Warranty.

The Contractor shall assume responsibility for all the associated warranty work specified in this section for a minimum period of five years, unless otherwise stated in the contract, after final acceptance of the Contract in accordance with 5-11, including continued responsibility as to any deficiencies to which notice was provided to the Contractor within such warranty period until all such pre-existing deficiencies are resolved.

**475-2 Responsible Party.**

For the purpose of VABC, the Contractor shall be the Responsible Party unless otherwise agreed to in writing by the Department. Upon final acceptance of the Contract in accordance with 5-11, the Contractor's responsibility for maintenance of all the work or facilities within the project limits of the Contract will terminate in accordance with 5-11; with the sole exception that the obligations set forth in this section for bridge components shall continue thereafter to be the responsibility of the Responsible Party as otherwise provided in this section.

**475-3 Evaluation and Remedial Action.**

**475-3.1 Definition of Value Added Bridge Components:** The following is a definition of the bridge components for which this provision applies and for which the Responsible Party shall warrant performance:

**Bridge Deck Expansion Joint Devices and Hardware:** Any device, with its accompanying hardware, that is installed inside the top of an expansion joint of a bridge deck in order to provide a smooth riding surface across the joint opening and to prevent water and debris from entering the joint. This includes expansion devices that are designed to handle large expansions and contractions such as modular bridge expansion devices.

**Coatings:** Paints, applied finishes or applied coatings that are used on the metal, concrete or wood surfaces of structures for the purpose of protection from the elements or for aesthetic enhancement.

**Bearing Devices:** A metal and/or elastomeric device that transfers loads and accommodates rotation and translation from a bridge superstructure element such as a beam, to a bridge substructure element such as a pier or bent without damage or overstress of either the substructure or the superstructure. All bearings transfer vertical loads, but fixed bearings only allow rotation and do not allow the superstructure to translate horizontally (expand and contract) in relation to the substructure. Expansion bearings allow the superstructure to translate horizontally as well as to rotate in relation to the substructure.

Use when requested and approved by the District Construction Engineer

**Bridge Lighting/Electrical Systems:** All electric power, electric control devices, and solar power units with accompanying hardware that are used to provide bridge navigation lighting, aesthetic lighting, and electric power for receptacles and lights used by maintenance and inspection personnel.

**Drainage Systems:** All components of the bridge deck drainage system including anchorages, hangers, pipes, couplings, bends, inlets, cleanouts and grates.

**475-3.2 Value Added Performance Period:** The Responsible Party shall warrant performance of bridge components for at least the following periods or for a longer period if offered by the Contractor in his proposal which starts on the date of final acceptance of the Contract:

- (a) Bridge Deck Expansion Joint Devices and Hardware: Armor and Hardware - 5 years, Seals - 5 years
- (b) Coatings: 5 years
- (c) Bearing Devices: 5 years
- (d) Bridge Lighting/Electrical Systems: 5 years
- (e) Drainage Systems: 5 years

**475-3.3 Deficiencies/Defects Requiring Remedial Action.** The following is a detailed description, for each type of structural component, of deficiencies/defects that will require remedial action by the Responsible Party:

**475-3.3.1 Bridge Deck Expansion Joint Devices and Hardware:** water leakage through joints; separation of the seal from the steel or concrete substrate; failure of the seal material such as cracking, chalking, scaling, peeling, or splitting; sagging of elastomeric seal; warping of the steel plate or extrusion that is detrimental to the functioning of the joint; separation of the steel plate or extrusion from the deck concrete; spalling or delamination of the deck concrete within 18 inches of either side of the joint; and any defect in modular bridge expansion joint elements including backing bars, steel extrusions, flexible membranes, proportioning bars, bushings, pins, bearings, side frames, and tracks.

**475-3.3.2 Coatings:** visible corrosion or corrosion break through; blistering, peeling or scaling of the coating; application of the coating over debris, blasting medium, mill scale or corrosion products; coating thickness less than specified by the manufacturer; damage to the paint system due to the Contractor's operations during construction; or excessive fading or chalking of the coating as determined by the paint manufacturer's performance standards for the coating in question.

**475-3.3.3 Bearing Devices:** evidence of failure of any of the elements of the bearing assembly; cracks, checks, peels or corrosion present in the protective coating of the bearing or in the neoprene of elastomeric bearings; the bearing freezes or fails to allow the bridge to move as designed; or the bearing moves out or "walks out" of its designated position and; therefore, does not perform as designed.

**475-3.3.4 Bridge Lighting/Electrical Systems:** loose, substandard or failed wiring, conduit, anchorages, expansion couplings, and junction boxes; inoperable lighting fixtures, contactors, switches or receptacles; inadequate grounding or surge protection; and defective circuit breakers, step down transformers and photo cells.

**475-3.3.5 Drainage Systems:** grates that will not stay in position as designed or that fail to collect debris as intended; leaking pipes, couplings, bends, cleanouts or inlets; anchorages and hangers that are defective or that do not function properly; unacceptable drainage



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discharge rates due to blockages in the system that are a result of construction defects and not solely attributable to accumulation of debris.

**475-3.4 Required Remedial Action and Response Times:** The Responsible Party will be required to remediate the deficiencies/defects described in 475-3.3, by taking the actions set forth in this provision for each type of VABC. The Responsible Party shall perform the required remedial actions within the maximum response times set forth in this provision and which start when written notification is received by the Responsible Party from the Department or when there is an emergency situation, response time starts with the Department's verbal notification which will be followed up in writing. If replacement components require a lengthy acquisition period, the maximum repair duration as specified in this provision will be extended at the Engineer's discretion. If the maximum response time will result in the Responsible Party completing the work after the performance period, as specified in 475-3.2, has expired then the expiration date for the affected structural component will automatically be extended to whichever comes first: the end of the maximum response time period or completion of the remedial action.

The Responsible Party shall complete all remedial work to the satisfaction of the Engineer.

The Statewide Disputes Review Board will resolve any disputes regarding the adequacy of the remedial work. Approval of remedial work does not relieve the Responsible Party from continuing responsibility under the provisions of this Specification.

Not less than 7 days prior to beginning any non-emergency remedial work, notify the Engineer in writing of the date when remedial work will begin. Meet the requirements of the Department's latest version of the Standard Specifications for Road and Bridge Construction when performing any remedial work.

Submit a written Work Plan to the Engineer for approval and do not begin remedial work until approval is received. The Work Plan shall describe the phases of construction that are planned and generally explain for each phase, the construction methods to be employed. In addition, the Work Plan shall list the materials that will be incorporated into the permanent VABC. For emergency situations, the Responsible Party shall discuss the Work Plan with the Engineer verbally and the Engineer will issue a temporary approval in order to allow work to begin in a timely manner. A written Work Plan as specified above will be required if the duration of the emergency remedial work extends beyond 72 hours.

Perform all remedial work at no cost to the Department.

**475-3.4.1 Bridge Deck Expansion Joint Devices and Hardware:** Damaged seals shall be removed and replaced with new seals. Seals that are displaced shall be completely removed, the joint shall be cleaned, and the seal may be reinstalled if not damaged during removal. Steel elements that are damaged, misaligned, or non-functional shall be restored to complete and full functionality. Remedial action for joint defects that represent an immediate traffic safety hazard (an emergency condition) shall begin within 4 hours of notification and work shall progress without interruption, 24 hours a day, until the immediate traffic safety hazard has been eliminated. Any remaining remedial work shall be completed as a non-emergency condition. For defects that may become a safety hazard in the near future, such as loose joint armor, remediation shall begin after 4 hours or as determined by the Engineer and shall be completed within 90 days. For all other defects, remediation shall be completed within 180 days.

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**475-3.4.2 Coatings:** Repair or restore coatings as recommended in writing by the coating manufacturer's technical advisors with concurrence of the Engineer. Remediation shall be completed within 180 days.

**475-3.4.3 Bearing Devices:** Bearings shall be removed and replaced with new bearings or with approval of the Engineer, be restored to new condition and be reinstalled. Remediation shall be completed within 30 days if the structure is displaying any sign of immediate structural damage to any element other than the bearing device/s due to a bearing device defect. All other bearing device defects shall be corrected within 90 days.

**475-3.4.4 Bridge Lighting/Electrical Systems:** Navigation lights shall be restored immediately (emergency situation) and the Responsible Party may use a temporary system if the permanent lighting cannot be restored immediately. If, after verbal notification of failure by the Department, the Responsible Party states that it cannot respond immediately to a navigation light failure then the Department will respond at the Responsible Party's expense. Aesthetic and inspection lighting shall be restored within 90 days. Defective electrical components that are isolated such as receptacles, photo cells or surge protectors, and that are not causing an entire electrical system to malfunction, shall be corrected within 120 days.

**475-3.4.5 Drainage Systems:** Replace or repair defective grates. Permanently repair any system leaks. Full drainage discharge rates shall be restored if reduced drainage discharge rates exist due to construction defects or other system deficiencies that occurred because of substandard construction practices. Repair or replace any nonfunctional or defective anchorages and hangers. Remedial action for drainage deficiencies that represent an immediate traffic safety hazard (an emergency condition) shall begin within 6 hours of notification by the Department and work shall progress without interruption, 24 hours a day, until the immediate traffic safety hazard has been eliminated. Any remaining remedial work shall be completed as a non-emergency condition. For all other deficiencies, remediation shall be completed within 180 days.

#### **475-4 Notification of Deficiencies/Defects and Inspections.**

The Department will identify deficiencies/defects in a written report that will be transmitted to the Responsible Party along with an official notification of required remedial action if warranted. The Department will also transmit copies of periodic bridge deficiency reports to the Responsible Party as they become available so that the Responsible Party can be aware of a deteriorating condition that may not require immediate remediation but that could give the Responsible Party an opportunity to perform an optional, more economical, preventive action. If an "Emergency Situation" exists, Responsible Party notification shall be provided verbally by the Department with written follow-up. In either case, the Responsible Party shall perform remedial actions in accordance with 475-3.4. If the Responsible Party fails to, or provides notification that it is unable to, begin work within the time designated in 475-3.4 or if the Responsible Party notifies the Department that it is unable to perform an acceptable remedial action, then the Department reserves the right to perform the remedial action at the Responsible Party's expense.

#### **475-5 Disputes Resolution.**

A Statewide Disputes Review Board dedicated to the resolution of value added disagreements will be utilized to resolve any and all disputes that may develop as a result of the administration and enforcement of this specification. The Responsible Party and the Department acknowledge that use of the Statewide Disputes Review Board is required and the determinations

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of the Board for disputes arising out of this VABC specification will be binding on both the Responsible Party and the Department, with no right of appeal by either party.

Any and all Board meetings after final acceptance of the Contract in accordance with 5-11, shall be requested and paid for by the Responsible Party. The Department will reimburse the Responsible Party for all fees associated with meetings.

#### **475-6 Value Added Work.**

During the value added performance period, the Responsible Party shall perform all necessary remedial work described in the Contract. Should an impasse develop in any regard as to the need for remedial work or the extent required, the Statewide Disputes Review Board will render a final decision.

The value added obligation for VABC will not apply to deficiencies if any of the following factors are found to be beyond the control of the Responsible Party: determination that the deficiency was due to the failure of other features not a part of the Contract; determination that the deficiency was the responsibility of a third party performing work not included in the contract or was the responsibility of an individual(s) that is not under the control of the Responsible Party or Contractor; or determination that the deficiency was caused by an act or event after final acceptance of the project, such as storm damage or vehicle impact, that is not under the control of the Responsible Party or Contractor.

#### **475-7 Failure to Perform.**

Should the Responsible Party fail to satisfactorily perform any remedial action, or fail to compensate the Department for any remedial action performed by the Department, as determined by the Statewide Disputes Review Board to be the Responsible Party's responsibility, the Department shall suspend, revoke or deny the Responsible Party's certificate of qualification under the terms of Section 337.16(d)(2), Florida Statutes, until the remedial work has been satisfactorily performed or full and complete payment for the remedial work is made to the Department. In no case shall the period of suspension, revocation, or denial of the Contractor's certificate of qualification be less than six (6) months. Should the Responsible Party choose to challenge the Department's notification of intent for suspension, revocation or denial of qualification and the Department's action is upheld, the Responsible Party shall have its qualification suspended for a minimum of six (6) months or until the remedial action is satisfactorily performed, whichever is longer.

The remedial work is not an obligation of the Contractor's bond required by Section 337.18, Florida Statutes.

#### **475-8 Traffic Control.**

During remedial action operations, perform all signing and traffic control in accordance with the current edition of the Department's Design Standards, Traffic Control through Work Zones. Provide Maintenance of Traffic (MOT) during remedial work at no additional cost to the Department. For non-emergency remedial work, the Engineer must approve all lane closures and traffic control plans in advance and notification of lane closures shall be made to the Engineer 5 days~~48 hours~~ in advance. For emergency remedial work and if the Responsible Party requests it, the Department will provide temporary MOT until the Engineer approves the Responsible Party's Traffic Control Plan. If MOT is requested, the Responsible Party shall reimburse the Department for all temporary MOT costs. In addition, if the urgency of the remedial work is such that the Department must provide MOT immediately and without delay prior to contacting the

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Responsible Party then the responsible Party shall reimburse the Department for all temporary MOT costs. Regardless of the Department's provision of MOT, the Responsible Party shall make every effort to submit a Traffic Control Plan in a timely manner to the Engineer and upon approval, shall deploy the permanent MOT expeditiously.

**475-9 Basis of Payment.**

All costs associated with remediation of VABC including, but limited to, labor, equipment and materials required for satisfactory completion of the remediation work; traffic control through the work zone; and access to the remediation site shall be paid for solely by the Responsible Party unless the Statewide Disputes Review Board determines otherwise.