

2018 Supplement to the 2016 VDOT Road and Bridge Specifications

This volume contains all revisions to the 2016 Road and Bridge Specifications effective 31 December 2017. All sections from the 2017 Supplement are included herein, except some may have been further revised. Projects which include the 2017 Supplement by reference must use that volume.

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SECTION 101 – DEFINITIONS OF ABBREVIATIONS, ACRONYMS, AND TERMS

SS101-002016-01

April 21, 2017

Section 101.01 – Abbreviations and Acronyms is amended to include the following:

- IEEE** Institute of Electrical and Electronics Engineers
- ISO** International Organization for Standardization
- OSHA** Occupational Safety and Hazard Administration

Section 101.02 – Terms is amended by replacing the below terms in bold type with the definitions which follow them:

Tidewater, Virginia. As defined in the Code of Virginia, § 62.1-44.15:68.

Section 101.02 – Terms is amended by inserting the below terms and definitions:

Internet. The electronic communications network that connects computer networks and organizational computer facilities around the world.

SECTION 102 – BIDDING REQUIREMENTS AND CONDITIONS

SS102-002016-01

July 12, 2016

Section 102.07 – Proposal Guaranty (Bid Bond) is amended by replacing the first paragraph with the following:

A bid in excess of \$250,000.00 will be rejected unless accompanied by a proposal guaranty, also known as a bid bond, made payable to the Commonwealth of Virginia, and executed on the Department's form (Form C-24), or on a form that contains the exact same wording as the Department's form. The amount of the proposal guaranty shall be 5 percent of the total bid. However, if the Bidder is eligible for the VirginiaWorks Self-Insured Payment & Performance Bond Program and his Bid is greater than \$250,000 but less than \$350,000, no proposal guaranty is required, but the Bidder is still subject to Section 103.07 of the Specifications.

SECTION 105 – CONTROL OF WORK

SS105-002016-02

December 14, 2016

Section 105.12 – Coordination of Plans, Standard Drawings, Specifications, Supplemental Specifications, Special Provisions, and Special Provision Copied Notes of the Specifications is replaced with the following:

The plans, Standard Drawings, Specifications, Supplemental Specifications, Special Provisions, Special Provision Copied Notes, and other Contract

Documents defined in Section 103.06 are parts of the Contract. A requirement occurring in one Contract Document shall be as binding as though occurring in all. The Contract Documents are intended to be complementary, and to include, describe and provide all items necessary for the Contractor's proper and complete performance of the Work.

In case of a discrepancy, the following order of priority will apply, with the highest governing item appearing first and the least governing item appearing last:

- (a) Special Provision Copied Notes. The Contract items, units and unit prices listed in the Contract's Schedule of Items have the same status as Special Provision Copied Notes.
- (b) Special provisions.
- (c) Plans.
- (d) Supplemental Specifications. Those present in the physical, executed Contract will govern over those published in the annual supplemental volume.
- (e) Specifications.
- (f) Standard Drawings (including all revisions issued through the date of Advertisement).

Calculated dimensions, unless obviously incorrect, will govern over scaled dimensions.

Drawings (with the exception of Standard Drawings), sketches, general notes, and other written information that are not included in Special Provisions or Special Provision Copied Notes used in No Plan and Minimum Plan Concept projects will have the same status as plans.

The Contractor shall not take advantage of any obvious or apparent ambiguity, conflict, error or omission in the plans or the Contract. If after beginning work the Contractor discovers an ambiguity, conflict, error, or omission in the Contract, he shall immediately notify the Engineer and before proceeding further with the affected work. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Contract.

Section 105.17 – Inspection of Work is amended by replacing the third paragraph with the following:

If the Engineer requests it, the Contractor shall remove or uncover such portions of the finished work as may be directed at any time before final acceptance. The Contractor shall restore such portions of the finished work to comply with the appropriate contract specification requirements. If the work exposed does not contain a defect, the uncovering or removing and replacing the covering or making good the parts removed will be paid for as extra work in accordance with Section 104.02 of the Specifications. If the uncovered work contains a defect, the cost of uncovering or removing and replacing the covering or making good the parts removed shall be borne by the Contractor whether or not the Engineer directs the Contractor to mitigate the defective work. Acceptance of substandard work does not negate the presence of the defect. For the purposes of this section, a defect shall mean any part of the Work that does not conform to the Contract.

SECTION 106 – CONTROL OF MATERIAL

SS106-002016-01

July 12, 2016

Section 106.08 – Storing Materials is amended to replace the third paragraph with the following:

Chemicals, fuels, lubricants, bitumens, paints, raw sewage, and other potential pollutant-generating materials as determined by the Engineer or defined in the *VPDES General Permit For Discharge of Stormwater from Construction Activities* shall not be stored within any flood-prone area unless no other location is available. A flood-prone area is defined as the area adjacent to the main channel of a river, stream or other waterbody that is susceptible to being inundated by water during storm events and includes, but is not limited to, the floodplain, the flood fringe, wetlands, riparian buffers or other such areas adjacent to the main channel. If stored in a flood-prone area, the material shall be stored in one or more secondary containment structures with an impervious liner and be removed entirely from the flood-prone area at least 24 hours prior to an anticipated storm event that could potentially inundate the storage area. Any storage of these materials outside of a flood-prone area that is in proximity to natural or man-made drainage conveyances where the materials could potentially reach a river, stream, or other waterbody if a release or spill were to occur, must be stored in a bermed or diked area or inside a secondary containment structure capable of preventing a release. Any spills, leaks or releases of such materials shall be addressed according to Section 107.16(b) and (e) of the Specifications. Accumulated rain water shall be pumped out of impoundment or containment areas into approved filtering devices. All proposed pollution prevention measures and practices must be identified by the Contractor in his Pollution Prevention Plan as required by the Specifications, other Contract documents and/or the *VD PES General Permit for Discharge of Stormwater from Construction Activities*.

SECTION 107 – LEGAL RESPONSIBILITIES

SS107-002016-04

August 10, 2017

Section 107.01 – Laws to Be Observed is amended by inserting the following:

Where the Specifications require the Contractor to interact with government agencies other than the Department, that agency's contact information can be found at <http://www.virginia.gov/business/const/specgovag.asp>.

Section 107.16(a) – Environmental Stipulations is amended by replacing the first paragraph with the following:

By signing the bid, the bidder certifies (unless the Contract is exempt under 42 USC 7606, 33 USC 1368, Executive Order 11738, and 2 CFR 1532.1140) that any facility to be used in the performance of the Contract is not listed on the Federal System for Award Management (SAM) Exclusions Public Extract according to 2 CFR 1532.1125; and that the bidder shall promptly notify the Department prior to the award of the Contract if the bidder receives any communication from the EPA, indicating that a facility to be used for the Contract is under consideration to be listed on the Federal SAM Exclusion Public Extract.

Section 107.16(a) – Environmental Stipulations is amended by deleting the third paragraph.

Section 107.16(b)2 – Air is replaced by the following:

Air: The Contractor shall comply with Section 107.01 and the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein. Precautions shall be taken at all times to prevent particulate matter from becoming airborne according to 9 VAC 5-50-80 and 9 VAC 5-50-90.

Burning shall be performed in accordance with all applicable local laws and ordinances and under the constant surveillance of watchpersons. Care shall be taken so that the burning of materials does not destroy or damage property or cause excessive air pollution. The Contractor shall not burn rubber tires, asphalt, used crankcase oil, or other materials that produce dense smoke. Burning shall not be initiated when atmospheric conditions are such that smoke will create a hazard to the motoring public or airport operations. Provisions shall be made for flagging vehicular traffic if visibility is obstructed or impaired by smoke. At no time shall a fire be left unattended.

Asphalt mixing plants shall be designed, equipped, and operated so that the amount and quality of air pollutants emitted will conform to the rules of the State Air Pollution Control Board.

a. **VOC Emission Control Areas** - The Contractor is advised that when the project is located in a volatile organic compound (VOC) emissions control area identified in 9 VAC 5-20-206 or Table I-3 below the following limitations shall apply:

- (1) Open burning is prohibited during the months of May, June, July, August, and September.
- (2) Cutback asphalt is prohibited April through October except when use or application as a penetrating prime coat or tack is necessary. See 9 VAC 5-45-760 et seq. (Emission Standards for Asphalt Paving Operations) and 9 VAC 5-20-206 (Regulations for the Control and Abatement of Air Pollution) for further clarification.

TABLE I-3

VOC Emissions Control Area	VDOT District	Jurisdiction
Northern Virginia	NOVA	Alexandria City Arlington County Fairfax County Fairfax City Falls Church City Loudoun County Manassas City Manassas Park City Prince William County
Northern Virginia	Fredericksburg	Stafford County
Fredericksburg	Fredericksburg	Spotsylvania County Fredericksburg City
Hampton Roads	Fredericksburg	Gloucester County
Hampton Roads	Hampton Roads	Chesapeake City Hampton City Isle of Wight County James City County Newport News City Norfolk City Poquoson City Portsmouth City Suffolk City Virginia Beach City Williamsburg City York County
Richmond	Richmond	Charles City County Chesterfield County Colonial Heights City

		Hanover County Henrico County Hopewell City Petersburg City Prince George County Richmond City
Western Virginia	Staunton	Frederick County Winchester City
Western Virginia	Salem	Roanoke County Botetourt County Roanoke City Salem City

(3) Emission standards for asbestos incorporated in the EPA's National Emission Standards for Hazardous Air Pollutants apply to the demolition or renovation of any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof that contains friable asbestos or where the Contractor's methods for such actions will produce friable asbestos.

b. The Contractor shall submit demolition notification to the EPA and the Virginia Department of Labor and Industry, in accordance with Section 107.01, a minimum of 10 business days prior to starting work on the following bridge activities:

- (1) Dismantling and removing existing structures
- (2) Moving an entire structure
- (3) Reconstruction and repairs involving the replacement of any load-bearing component of a structure

The Contractor shall provide written notification to the Engineer a minimum of 3 full business days prior to work being performed.

Section 107.16(e)3 – SWPPP Requirements for Support Facilities is amended to include the following:

The Contractor shall develop and enforce a Spill Prevention Control and Countermeasure (SPCC) Plan conforming to 40 CFR 112 if the aggregated volume of Oil stored within the project limits at any one time is greater than 1320 gallons. Oil, in this context, shall be defined according to 40 CFR 112. The aggregated volume includes that of both stationary and portable storage facilities but does not include individual storage containers with less than a 55 gallon capacity. The Contractor shall include the SPCC Plan as a part of his Pollution Prevention Plan for the project.

Section 107.16(e)4a – Inspection Requirements is replaced with the following:

Inspection Requirements: The Contractor shall be responsible for conducting site inspections according to the requirements herein. Site inspections shall include erosion, sediment control, and pollution prevention practices and facilities; all areas of the site disturbed by construction activity; all on-site support facilities; and all off site support facilities within VDOT right of way or easement. The Contractor shall document such inspections by completion of Form C-107, Construction Runoff Control Inspection Form, according to the directions contained within the form. Inspections shall be conducted using one of the following schedules:

- Schedule 1 - At least once every 7 calendar days (equivalent to the once every five business days schedule in the VPDES *General Permit for Discharge of Stormwater from Construction Activities*) and within 48 hours following any measureable storm event. If a measureable storm event occurs when there are more than 48 hours between business days, the Contractor shall perform his inspection no later than the next business day. The Contractor shall install a rain gauge at a central location on the project site for the purposes of determining the occurrence of a measureable storm event. Where the project is of such a length that one rain gauge may not provide an accurate representation of the occurrence of a measurable storm event over the entire project site, the Contractor shall install as many rain gauges as necessary to accurately reflect the amount of rainfall received over all portions of the project. The Contractor shall observe all rain gauges no less than once each business day at the time prescribed in the SWPPP General Information Sheet notes in the construction plans or other contract documents to determine if a measureable storm event has occurred. The procedures for determining the occurrence of a measurable storm event are identified in the SWPPP General Information Sheet notes in the construction plans or other contract documents.
- Schedule 2 - At least each Monday and Thursday (equivalent to the once every four business days schedule in the VPDES *General Permit for Discharge of Stormwater from Construction Activities*). Where Monday or Thursday is a non-business day, the inspection may be performed on the next business day afterward. In no case shall the inspections be performed less than once every four business days. A rain gauge will not be required when using Schedule 2.

The inspection schedule (1 or 2) is to be selected prior to the beginning of land disturbance. Once an inspection schedule is selected, it shall be defined in the appropriate note in the SWPPP General Information Sheets contained in the construction plan set and shall be used for the duration of the project. A business day is defined as Monday through Friday excluding

State holidays. A measurable storm event is defined as one producing 0.25 inches of rainfall or greater over a 24 hour time period.

For those areas of the site that have been temporarily stabilized or where land disturbing activities have been suspended due to continuous frozen ground conditions and stormwater discharges are unlikely, the inspection schedule may be reduced to once per month. If weather conditions (such as above freezing temperatures or rain or snow events) make stormwater discharges likely, the Contractor shall immediately resume the regular inspection schedule. Those definable areas where final stabilization has been achieved will not require further inspections provided such areas have been identified in the project's Stormwater Pollution Prevention Plan.

Section 107.17 – Construction Safety and Health Standards is replaced with the following:

In the performance of this Contract the Contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The Contractor, subcontractors at any tier, and their respective employees, agents and invitees, shall at all times while in or around the project site comply with all applicable laws, regulations, provisions, and policies governing safety and health under the VOSH Standards adopted under the Code of Virginia, and any laws, regulations, provisions, and policies incorporated by reference including, but not limited to, the Federal Construction Safety Act (Public Law 91-54), 29 CFR 1926, and the Occupation Safety and Health Act (Public Law 91-596), 29 CFR 1910, and subsequent publications updating these regulations.

The Contractor shall provide all safeguards, safety devices and protective equipment, and take any other needed actions as it determines, or as the Engineer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public, and to protect property in connection with the performance of the Work. The Contractor shall be responsible for maintaining and supervising all safety and health protections and programs to ensure compliance with this Section. The Contractor shall routinely inspect the project site for safety and health violations. The Contractor shall immediately abate any violations of the safety and health requirements or duties at no cost to the Department.

It is a condition of this Contract, and shall be made a condition of each subcontract, which the Contractor enters into pursuant to this Contract, that the Contractor and any subcontractor shall not permit any employees, in performance of the Contract, to work in surroundings or under conditions which are unsanitary, hazardous, or dangerous to their health or safety, as determined by the Virginia Work Area Protection Manual or under construction safety and health standards (29 CFR 1926) promulgated by the

Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 USC 3704).

VOSH personnel, on all Federal-aid construction contracts and related subcontracts, pursuant to 29 CFR 1926.3, the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out their duties.

The Contractor shall maintain a Jobsite Hazard Assessment in accordance with 29 CFR 1910.132 which shall be provided to the Engineer upon request and contain the following requirements, unless otherwise determined unsafe or inappropriate according to OSHA regulations:

- Hard hats shall be worn while participating in or observing all types of field work when outside of a building or outside of the cab of a vehicle, and exposed to, participating in or supervising construction.
- Respiratory protective equipment shall be worn whenever an individual is exposed to any item listed in the OSHA Standards as needing such protection unless it is shown that the employee is protected by engineering controls.
- Adequate eye protection shall be worn in the proximity of grinding, breaking of rock and/or concrete, while using brush chippers, striking metal against metal or when working in situations where the eyesight may be in jeopardy.
- A safety vest shall be worn by all exposed to vehicular traffic and construction equipment.
- Standards and guidelines of the current VWAPM shall be used when setting, reviewing, maintaining, and removing traffic controls.
- No person shall be permitted to position themselves under any raised load or between hinge points of equipment without first taking steps to support the load by the placing of a safety bar or blocking.
- Explosives shall be purchased, transported, stored, used and disposed of by a Virginia State Certified Blaster in possession of a current criminal history record check and a commercial driver's license with hazardous materials endorsement and a valid medical examiner's certificate. All Federal, State and local regulations pertaining to explosives shall be followed.
- All electrical tools shall be adequately grounded or double insulated. Ground Fault Circuit Interrupter (GFCI) protection must be installed in accordance with the National Electrical Code (NEC) and current VOSH agency. If extension cords are used, they shall be free of defects and designed for their environment and intended use.
- No person shall enter a confined space without training, permits and authorization.
- Fall protection shall be used whenever an employee is exposed to a fall 6 feet or greater.

Section 208.06 – Acceptance is amended by replacing the sixth paragraph with the following:

If the liquid limit exceeds 30 or the plasticity index exceeds 6 for Type I base material or No. 19 subbase material; or the plasticity index exceeds 9 for Type II base material or subbase materials No. 20, 21, 21A, 21B, or 22 on any individual sample; that portion of the lot from which the sample was taken will be considered a separate part of the lot and the Contractor shall remove that portion from the roadway.

Section 210.02(g) – Polymer Modified Cationic Emulsified Asphalt is replaced with the following:

Polymer Modified Cationic Emulsified Asphalt shall conform to AASHTO M316 except for the Penetration requirement at 77 °F which shall be a minimum 70 and maximum 140. The softening point shall have a minimum value of 100°F.

Section 210.07(c)1b – CSS-1h is renamed **CQS-1h** and is replaced with the following:

CQS-1h (Quick Set) shall be tested the same as Cationic Emulsions, with the addition of “Quick set Emulsified Asphalt Setting Time (VTM-89).”

Section 210.07(c)1c(2) – CRS-2 Latex is replaced with the following:

CRS-2 Latex

(a) Tests on Emulsions

- Saybolt Furol Viscosity
- Sieve Test (if necessary)
- Particle Charge Test
- Residue by Evaporation

(b) Tests on residue by Evaporation

- Penetration

- Ring and Ball Softening Point
- Elastic Recovery
- Ductility, 25°C, 5 cm/min

Section 210.07(d) – Non-Tracking Tack is replaced with the following:

Non-Tracking Tack:

Certified Test Reports for Non-Tracking Tack shall be based upon the results of tests performed, as specified below:

1. Tests on Non-Tracking Tack:
 - Residue by Distillation
2. Tests on residue by distillation:
 - Ring and Ball Softening Point
 - Penetration

SECTION 211 – ASPHALT CONCRETE

SS211-002016-02

August 3, 2017

Section 211.01—Description is replaced with the following:

Asphalt concrete shall consist of a combination of mineral aggregate and asphalt material mixed mechanically in a plant specifically designed for such purpose.

An equivalent single-axle load (ESAL) will be established by the Engineer, and SUPERPAVE mix types may be specified as one of the types listed as follows:

Mix Type	Equivalent Single-Axle Load (ESAL) Range (millions)	Minimum Asphalt Performance Grade (PG)¹	Aggregate Nominal Maximum Size²
SM-9.0A	0 to 3	64S-16	3/8 in
SM-9.0D	3 to 10	64H-16	3/8 in
SM-9.0E	Above 10	64E-22	3/8 in
SM-9.5A	0 to 3	64S-16	3/8 in
SM-9.5D	3 to 10	64H-16	3/8 in

SM-9.5E	Above 10	64E-22	3/8 in
SM-12.5A	0 to 3	64S-16	1/2 in
SM-12.5D	3 to 10	64H-16	1/2 in
SM-12.5E	Above 10	64E-22	1/2 in
IM-19.0A	Less than 10	64S-16	3/4 in
IM-19.0D	10 to 20	64H-16	3/4 in
IM-19.0E	20 and above	64E-22	3/4 in
BM-25.0A	All ranges	64S-16	1 in
BM-25.0D	Above 10	64H-16	1 in

¹**Minimum Asphalt Performance Grade (PG)** is defined as the minimum binder performance grade for the job mixes as determined by AASHTO T170 or AASHTO M332.

²**Aggregate Nominal Maximum Size** is defined as one sieve size larger than the first sieve to retain more than 10 percent aggregate.

Note: SM = Surface Mixture; IM = Intermediate Mixture; BM = Base Mixture

Asphalt concrete shall conform to the requirements for the mix type designated on the plans or elsewhere in the Contract for use.

At the Contractor's option, an approved Warm Mix Asphalt (WMA) additive or process may be used to produce the asphalt concrete (AC) mix type designated.

Table II-13 – Asphalt Concrete Mixtures: Design Range is replaced with the following:

TABLE II-13
Asphalt Concrete Mixtures: Design Range
Percentage by Weight Passing Square Mesh Sieves

Mix Type	2 in	1 1/2 in	1 in	3/4 in	1/2 in	3/8 in	No. 4	No. 8	No. 30	No. 50	No. 200
SM-9.0 A,D,E					100 ¹	90-100	90 max.	47-67			2-10
SM-9.5 A,D,E					100 ¹	90-100	58-80	38-67	23 max		2-10
SM-12.5 A,D,E			100	95-100	90 max.	58-80	34-50	23 max			2-10
IM-19.0 A,D,E		100	90-100	90 max.	--	--	28-49				2-8
BM-25.0 A,D	100	90-100	90 max.	--	--	--	19-38				1-7
C (Curb Mix)					100	92-100	70-75	50-60	28-36	15-20	7-9

¹A production tolerance of 1% will be applied to this sieve regardless of the number of tests in the lot.

Table II-14 – Mix Design Criteria is replaced with the following:

TABLE II-14
Mix Design Criteria

Mix Type	VTM (%) Production	VFA (%) Design	VFA (%) Production	Min. VMA (%)	Fines/ Asphalt Ratio	No. of Gyrations N Design
SM-9.0A ^{1,2}	2.0-5.0	75-80	70-85	17.0	0.6-1.3	50
SM-9.0D ^{1,2}	2.0-5.0	75-80	70-85	17.0	0.6-1.3	50
SM-9.0E ^{1,2}	2.0-5.0	75-80	70-85	17.0	0.6-1.3	50
SM-9.5A ^{1,2}	2.0-5.0	75-80	70-85	16.0	0.7-1.3	50
SM-9.5D ^{1,2}	2.0-5.0	75-80	70-85	16.0	0.7-1.3	50
SM-9.5E ^{1,2}	2.0-5.0	75-80	70-85	16.0	0.7-1.3	50
SM-12.5A ^{1,2}	2.0-5.0	73-79	68-84	15.0	0.7-1.3	50
SM-12.5D ^{1,2}	2.0-5.0	73-79	68-84	15.0	0.7-1.3	50
SM-12.5E ^{1,2}	2.0-5.0	73-79	68-84	15.0	0.7-1.3	50
IM-19.0A ^{1,2}	2.0-5.0	69-76	64-81	13.0	0.6-1.2	65
IM-19.0D ^{1,2}	2.0-5.0	69-76	64-81	13.0	0.6-1.2	65
IM-19.0E ^{1,2}	2.0-5.0	69-76	64-81	13.0	0.6-1.2	65
BM-25.0A ^{2,3}	1.0-4.0	67-87	67-92	12.0	0.6-1.3	65
BM-25.0D ^{2,3}	1.0-4.0	67-87	67-92	12.0	0.6-1.3	65

¹Asphalt content should be selected at 4.0% air voids for A & D mixes, 3.5% air voids for E mix.

²Fines-asphalt ratio is based on effective asphalt content.

³Base mix shall be designed at 2.5% air voids. BM-25A shall have a minimum asphalt content of 4.4% unless otherwise approved by the Engineer. BM-25D shall have a minimum asphalt content of 4.6% unless otherwise approved by the Engineer.

Section 211.04(e)4 – Type E(HP) asphalt mixtures is inserted as follows:

Type E(HP) asphalt mixtures shall consist of mixes incorporating a neat asphalt material with a high polymer modification (approximately 7.5%) complying with AASHTO M332 for PG 76E-28(HP) with the exception that Multiple Stress Creep and Recovery (MSCR) shall have a $J_{nr3.2}$ maximum value of 0.1 kPa⁻¹ when tested according to AASHTO T350. The minimum MSCR % recovery at 3.2 kPa shall be 90%. The MSCR test for J_{nr} and % recovery shall be run at 76°C. The viscosity shall be less than or equal to 3.0 Pa-s, however the Engineer may increase this limit to 5.0 Pa-s if the binder supplier and contractor agree that the binder is suitably workable. HP designated mixtures shall not contain more than 15% RAP material.

Section 211.05 – Testing is amended by deleting the eighth and ninth paragraphs.

SECTION 212 – JOINT MATERIALS

SS212-002016-01

May 13, 2016

Section 212.02(h) – Gaskets for pipe is replaced with the following:

Gaskets for pipe and box culvert sections shall conform to the following: Rubber gaskets for ductile iron pipe and fittings shall conform to AWWA C111. Rubber gaskets for concrete and metal pipe shall conform to ASTM C443. Rubber gaskets for plastic pipe shall conform to ASTM F 477. Flexible cellular sponge or expanded rubber gaskets for metal pipe shall conform to ASTM D1056. Gaskets for box culvert sections shall conform to ASTM C1677. All gaskets shall conform to the ozone cracking resistance described in Section 237.02 of the Specifications.

SECTION 223 – STEEL REINFORCEMENT

SS223-002016-02

August 23, 2017

Section 223.02(e) – Corrosion Resistant Reinforcing Steel, Class I is replaced with the following:

Corrosion Resistant Reinforcing Steel, Class I shall conform to AASHTO M 334M/M 334-17 Type 1035 CS with a minimum chromium content of 9.2% or UNS (Unified Numbering System for Metals and Alloys) Designation: S24100.

Section 223.02(f) – Corrosion Resistant Reinforcing Steel, Class II is replaced with the following:

Corrosion Resistant Reinforcing Steel, Class II shall conform to AASHTO M 334M/M 334-17. UNS Designation: S32101.

Section 223.02(g) – Corrosion Resistant Reinforcing Steel, Class III is replaced with the following:

Corrosion Resistant Reinforcing Steel, Class III shall conform to AASHTOM 334M/M 334-17 . UNS Designations: S24000, S30400, S31603, S31653, S31803, and S32304.

SECTION 232 – PIPE AND PIPE ARCHES

SS232-002016-02

May 22, 2017

Section 232.02(c)1 – Corrugated steel culvert pipe and pipe arches is replaced with the following:

Corrugated steel culvert pipe and pipe arches shall conform to AASHTO M36 except that helically formed pipe shall be tested in accordance with AASHTO T249 at the rate of one test per week per corrugation machine per

work shift. The Contractor shall maintain records of such test for a period of 24 months. Pipe shall be fabricated from materials conforming to AASHTO M218 for galvanized pipe, AASHTO M274 for aluminum coated pipe, AASHTO M246 for polymer coated pipe and AASHTO M289 for aluminum zinc alloy coated pipe. Steel spiral rib pipe shall be of smooth wall spiral rib construction. When connecting bands or flared end sections are required, helically formed pipe shall have rerolled ends with a minimum of two annular corrugations. End sections shall be produced in accordance with AASHTO M36 from materials conforming to the applicable requirements of AASHTO M218 for use with galvanized pipe, AASHTO M274 for use with aluminum-coated or polymer coated pipe, or AASHTO M289 for use with aluminum zinc alloy-coated pipe.

Joints shall be installed as specified on the plans, in the event the joint is not specified, it shall be a leak-resistant joint.

Section 232.02(c)4a – Steel encasement pipe is replaced with the following:

Steel encasement pipe shall conform to ASTM A139 or ASTM A53 with a minimum wall thickness of 0.500 inch and shall have beveled edges suitable for welding or be threaded. The hydrostatic test for such pipe will not be required.

Section 232.02(c)7 – Concrete-lined corrugated steel pipe is deleted, and paragraphs 8 and 9 are renumbered to 7 and 8, respectively.

Section 232.02(l) – Polypropylene (PP) Pipe is replaced with the following:

Polypropylene (PP) Pipe: PP corrugated culvert and storm drain pipe shall conform to AASHTO M330, and shall be double wall pipe (Type S) for nominal diameters of 12 inches through 30 inches, inclusive, and shall be triple wall pipe (Type D) for nominal diameters of 36 inches through 60 inches, inclusive. The Department will not permit the use of polypropylene pipe less than 12 inches or greater than 60 inches in diameter. Fittings and joining systems shall also meet AASHTO M330.

Section 232.02(m) – Pipe Joints is inserted as follows:

Pipe joints shall meet the requirements of AASHTO PP-63 for Soil-Tight, Silt-Tight, Leak-Resistant or other special design, except that leak-resistant joints shall not require infiltration or exfiltration testing in the field, and joints shall be on VDOT Materials Division Approved List for pipe joints. Pipe Joint systems shall be submitted to the Materials Division certifying the system meets the requirements for Soil-Tight, Silt-Tight, Leak-Resistant or Special Design in order to be on the approved list.

Section 232.02(n) – Pipe to Structure Connections and Waterstops is inserted as follows:

Manufactured pipe connection systems for connecting pipe to drainage structures shall be submitted to the Materials Division certifying the system meets the requirements for Soil-Tight, Silt-Tight, or Leak-Resistant in order to be on the approved list. When resilient connectors for silt tight connections are specified for concrete pipe to concrete structures, the connectors shall meet the requirements of ASTM C1478. When resilient connectors for leak resistant connections are specified for flexible pipe to concrete structures, the connectors shall meet the requirements of ASTM F2510.

When waterstops are specified, they shall meet the requirements of ASTM F2510, Section 4.1 Materials and Manufacture and Section 4.2 Mechanical Devices. The waterstop shall have a 1 inch minimum keylok anchor embedded into the concrete or mortar connection on pipe sizes below 18 inch diameter and 1.5 inch for pipe 18 inches and greater in diameter. There shall be a minimum 2 inches of concrete or mortar connection around the rubber gasket to permit proper consolidation around the gasket. All waterstops shall be secured to the pipe with a take-up clamp before applying mortar.

SECTION 242 – FENCES

SS242-002016-01

February 1, 2017

Section 242.02(c)2 – Posts for temporary silt fences is replaced with the following:

Posts for temporary silt fences shall be a nominal 2 by 2 inch oak, or steel having a weight of at least 1.25 pounds per linear foot.

SECTION 244 – ROADSIDE DEVELOPMENT MATERIALS

SS244-002016-01

July 5, 2016

Section 244.02(l) – Rolled Erosion Control Products is replaced by the following:

Rolled Erosion Control Products:

1. **Rolled Erosion Control Products (Standard EC-2)** shall conform to Table II-22C and the following requirements. EC-2 products shall be designed for use on geotechnically stable slopes and channels as detailed herein.
 - a. **EC-2, Type 1** shall be a relative short-term single-net erosion control blanket or open weave textile. EC-2, Type 1 shall be one of the following materials: (1) an erosion control blanket composed of

processed degradable natural or polymer fibers mechanically-bound together by a single degradable synthetic or natural fiber netting to form a continuous matrix; or (2) an open weave textile composed of processed degradable natural or polymer yarns or twines woven into a continuous matrix. EC-2, Type 1 shall typically have a 12-month functional longevity from the date of installation, be designed for use on up to 1V:3H slopes and channels, with shear stresses up to 1.50 pounds per square foot.

- b. **EC-2, Type 2** shall be a relative short-term double-net erosion control blanket. The blanket shall be composed of processed natural or polymer fibers mechanically bound between two natural fiber or synthetic nettings to form a continuous matrix. EC-2, Type 2 materials shall typically have a 12-month functional longevity from the date of installation, be designed for use on up to 1V:2H slopes and channels, with shear stresses up to 1.75 pounds per square foot.
- c. **EC-2, Type 3** shall be an extended term erosion control blanket or open weave textile. EC-2, Type 3 blankets shall be one of the following materials: 1) an erosion control blanket composed of processed slow degrading natural or polymer fibers mechanically-bound together between two slow degrading synthetic or natural fiber nettings to form a continuous matrix; or 2) an open weave textile composed of processed slow degrading natural or polymer yarns or twines woven into a continuous matrix. EC-2, Type 3 material shall typically have a 24-month functional longevity from the date of installation, be designed for use on slopes up to 1V:1.5H and channels, with shear stresses up to 2.00 pounds per square foot.
- d. **EC-2 Type 4** shall be a long-term erosion control blanket or open weave textile. EC-2, Type 4 blankets shall be one of the following materials: (1) an erosion control blanket composed of processed slow degrading natural or polymer fibers mechanically-bound together between two slow degrading synthetic or natural fiber nettings to form a continuous matrix; or (2) an open weave textile composed of processed slow degrading natural or polymer yarns or twines woven into a continuous matrix. EC-2, Type 4 material shall typically have a 36-month functional longevity from the date of installation, be designed for use on up to 1V:1H slopes and channels, with shear stresses up to 2.25 pounds per square foot.

2. **Permanent Rolled Erosion Control Products (Standard EC-3)** shall be permanent turf reinforcement mats conforming to Table II-22D and the following.

- a. **EC-3, Type 1** shall be a non-degradable mat of sufficient thickness, strength and void space for permanent erosion protection and

vegetation reinforcement on geotechnically stable slopes with gradients up to 1V:1.5H, channels with design shear stresses up to 6.0 pounds per square foot, and on other areas where design flow conditions exceed the limits of sustainability for mature natural vegetation.

- b. **EC-3, Type 2** shall be a non-degradable mat with sufficient thickness, strength and void space for permanent erosion protection and vegetation reinforcement on geotechnically stable slopes with gradients up to 1V:1H, channels with design shear stresses up to 8.0 pounds per square foot, and other areas where design flow conditions exceed the limits of sustainability for mature natural vegetation.
- c. **EC-3, Type 3** shall be a non-degradable mat with sufficient thickness, strength and void space for permanent erosion protection and vegetation reinforcement for use on geotechnically stable slopes up to 1V:0.5H, channels with design shear stresses up to 10.0 pounds per square foot, and other areas where design flow conditions exceed the limits of sustainability for mature natural vegetation.

SECTION 245 – GEOSYNTHETICS AND LOW PERMEABILITY LINERS
SS245-002016-04 **February 6, 2017**

Section 245.03 – Testing and Documentation is amended by replacing the third paragraph with the following:

Property values in these specifications represent minimum average roll values (MARV) in the weakest principal direction unless direction is otherwise specified; permittivity values specified are minimum; AOS and panel vertical strain values are maximum; mass per unit area, UV degradation, and asphalt retention values are typical.

Section 245.03(e) – Prefabricated Geocomposite Pavement Underdrain is replaced with the following:

Prefabricated Geocomposite Pavement Underdrain: Prefabricated geocomposite pavement underdrain shall consist of a polymeric drainage core encased in a nonwoven filter fabric envelope having sufficient flexibility to withstand bending and handling without damage. Prefabricated geocomposite pavement underdrain shall conform to the following:

1. **Core:** The drainage core shall be made from an inert, polymeric material resistant to commonly encountered chemicals and substances in the pavement environment and shall have a thickness of not less than 3/4 inch. Outer surfaces shall be smooth to prevent excessive wear of bonded filter fabric.

Physical Properties	Test Method	Requirements
Compressive strength panel vertical strain and core area change	ASTM D1621/D2412/D6364	Min. 40 psi at 20% deflection after 24 hrs at 0 deg F and at 125 deg F
Water flow rate (after 100 hr at 10 psi normal confining pressure gradient of no more than 0.1)	ASTM D4716	Min. 15 gal/min/ft width for 12-in specimen length

- Filter Fabric:** Geotextile shall be bonded to and tightly stretched over the core. Geotextile shall not sag or block the flow channels, shall have a life equivalent to that of the core material, and shall conform to the requirements of (c) herein.

Section 245.03(f) – Geocomposite Wall Drains is replaced with the following:

Geocomposite Wall Drains: Prefabricated geocomposite wall drain shall consist of a polymeric drainage core encased in a nonwoven filter fabric envelope having sufficient flexibility to withstand bending and handling without damage. Geocomposite wall drains shall conform to the following:

- Core:** The drainage core shall be made from an inert, polymeric material resistant to commonly encountered chemicals and substances in the roadway. Outer surfaces shall be smooth to prevent excessive wear of bonded filter fabric.

Physical Property	Test Method	Requirements
Compressive strength at 20% deflection	ASTM D1621/D2412/D6364	Min. 40 psi after 24 hrs at 0 degree F and at 125 degree F
Water flow rate (after 100 hr at 10 psi normal confining pressure and gradient of no more than 1.0)	ASTM D4716	Min. 15 gal/min/ft width (for 12-in specimen length)

- Filter Fabric:** Geotextile shall be bonded to and tightly stretched over both sides of the core. Geotextile shall not sag or block the flow channels, shall have a life equivalent to that of the core material, and shall conform to the requirements of (c) herein, except that grab strength requirement shall meet AASHTO M288 Table 1, Class 2.

Section 245.03(h) – Dewatering Bag is replaced with the following:

Dewatering Bag: A nonwoven geotextile sewn together to form a bag that can be used in lieu of a de-watering basin for the purpose of filtering out

suspended soil particles. The bag shall be capable of accommodating the water flow from the pump without leaking at the spout and seams.

Physical Property	Test Method	Requirements
Grab strength @ Elongation >50%(CRE/Dry)	ASTM D4632	Min. 250 lb (min)
Seam strength	ASTM D4632	90% Specified grab strength
Puncture	ASTM D6241	Min. 150 lb
Flow rate	ASTM D4491	Min. 0.189 ft3/sec/ft2(min)
Permittivity	ASTM D4491	Min. 1.2 sec-1
UV resistance	ASTM D4355	Min. 70% at 500 hr
AOS	ASTM D4751	Max. 100 sieve

Section 245.03(k) Fabric for Use in Turbidity Curtains is inserted as follows:

Fabric for Use in Turbidity Curtains: This fabric shall consist of synthetic fabric coated with suitable elastomeric or polymeric compound. The coating shall have a high resistance to weathering, hydrocarbons, fresh and salt water, and temperature extremes. The curtain shall form a continuous vertical and horizontal barrier for the entire width and length of each section. Seams, if required, shall be either vulcanized welded or sewn and shall develop the full strength of the fabric.

The curtain fabric shall meet the minimum requirements noted below:

Physical Properties of Turbidity Curtain Fabric	
Physical Property	Requirement
Weight (oz/yd ²)	
Type I	18
Type II	22
Type III	22
Grab Tensile Strength (ASTM D 4632)	300 lbs
UV Inhibitor	Required

SECTION 302 – DRAINAGE STRUCTURES

SS302-002016-01

April 28, 2016

Section 302.03(a)2d – Joining Pipe is replaced with the following:

Joining pipe: The inspector will verify the correct joint materials are used and installed correctly.

- (1) **Rigid pipe:** The Contractor’s method of joining pipe sections shall be such that the sections are aligned and firmly joined to form the joint as specified on the plans.. The joint type shall be installed as specified on the plans, in the event the joint is not specified, it shall be a leak-resistant joint.

- (2) **Flexible pipe:** Flexible pipe sections shall be aligned and firmly joined to form the joint as specified on the plans. In the event the joint is not specified, it shall be a leak-resistant joint.

Section 302.03(a)3 – Tunneling operations is amended by replacing the sixth paragraph with the following:

Joints will be designed by the Engineer and specified on the plans.

Section 302.03(b) – Precast Drainage Structures is amended by inserting the following language after the first paragraph:

Precast units, excluding concrete pipe and prestressed concrete items, conforming to the requirements herein will only be accepted under a Quality Assurance (QA) Program. The Contractor shall have the producer perform quality control functions in accordance with a Department approved QA plan. Each piece, manufactured under the QA program, in addition to the date and other required markings, shall be stamped with the letters (QC), as evidence that the required quality control procedures have been performed by the producer. Each shipping document shall be affixed with the following:

We certify that these materials have been tested and conform to VDOT Precast Concrete Products Quality Assurance Program

Signature and Title

Section 302.03(b)1 – Standard Precast Drainage Units is replaced with the following:

Standard precast drainage units shall conform to the material requirements of AASHTO M 199 and the following:

- a. If the grade on the adjacent gutter is less than 1.5 percent, the grade on the invert of the throat section of the inlet shall be at least 1.5 percent. Precast throats having flat inverts will be permitted in sag locations provided the total length of the required throat opening does not exceed 6 feet.
- b. Pipe openings in precast drainage units shall not exceed the outside cross-sectional dimensions of the pipes by more than a total of 8 inches regardless of the placement of the pipes, the angles of intersection, or the shapes of the pipes. Pipe openings shall be formed, neatly drilled, or neatly cut.

- c. The Contractor shall use the connection specified on the plans to connect pipe to structure. In the event the joint is not specified, it shall be a leak-resistant joint.
- d. When precast units are to be located adjacent to the subbase or base pavement course, the Contractor shall furnish units with chambers having weep holes 3 inches in diameter and hardware cloth. Weep holes shall be located to drain the subbase or base.
- e. Precast units located adjacent to cast-in-place concrete items, such as flumes, ditches, and gutters shall be connected to the adjacent unit by means of No. 4 smooth steel dowels spaced on approximately 12-inch centers throughout the contact length and extending at least 4 inches into the precast unit and the cast-in-place item. If holes to receive the dowels are provided in the precast unit, they shall be not more than 5/8 inch in diameter. The Engineer must approve other methods of providing the connection, such as keyed joints prior to fabrication.
- f. The chamber section shall be installed in the plumb position. The throat and top sections shall have positive restraints, such as adjacent concrete, pavement, or soil, on all sides to prevent displacement and shall have a positive interlock, such as dowels, with the chamber section. The throat and top sections shall be installed to conform to the normal slope of the finished grade and may be canted up to a maximum grade of 10 percent. The chamber may be built up to a maximum of 12 inches at any point to provide for complete and uniform bearing of the throat and top sections on the chamber flat slab top or other approved top section. The built-up section shall be constructed using whole concrete spacer units where feasible and partial and whole sections of concrete block or brick with high-strength grout and mortar. High-strength grout shall be used to provide the final grade adjustment and uniform bearing. The width of the built-up section shall match the wall thickness of the chamber section. The concrete block and brick shall be thoroughly bonded with mortar and the inside and outside of the built-up section shall be plastered with mortar except that the concrete spacer unit shall not be plastered.

Section 302.03(b)2c – Joints is replaced with the following:

Joints: Precast arch joints shall meet the requirements of AASHTO PP-63 and be on VDOT Materials Division Approved List No. 14 for pipe joints. The joint type shall be installed as specified on the plans, in the event the joint is not specified, it shall be a leak-resistant joint.

Section 302.03(c) – Drop Inlets, Manholes, Junction Boxes, Spring Boxes, Intake Boxes, and Endwalls is amended by replacing the ninth paragraph with the following:

Inlet and outlet pipe connections shall be as specified on the plans. In the event the joint is not specified, it shall be a leak-resistant joint. Pipe sections shall be flush on the inside of the structure wall and shall project outside sufficiently for proper connection with the next pipe section. When masonry connections are used, the masonry shall fit neatly and tightly around the pipe, and shall be finished on the exterior of the structure prior to backfilling, and finished on the interior of the structure after backfilling of the structure.

Section 302.04 – Measurement and Payment is amended by replacing the twelfth paragraph with the following:

Cast-in-place box culverts will be measured in cubic yards of concrete and pounds of reinforcing steel and will be paid for at the contract unit price per cubic yard of concrete and per pound of reinforcing steel. These prices shall include sheeting, shoring, dewatering, waterproofing, disposing of surplus and unsuitable material, restoring existing surfaces, the upper 6 inches of bedding material within the neat lines shown on the Standard PB-1 drawings, and all necessary work to key the bottom slab into an existing rock foundation. When not a pay item the cost of temporary stream relocation to facilitate the installation of the structure shall be included in the price for the concrete and steel. Minor Structure Excavation will be paid for in accordance with Section 303 of the Specifications.

Section 302.04 – Measurement and Payment is amended by replacing the fourteenth paragraph with the following:

Precast box culverts will be measured in linear feet along the centerline of the barrel from face of curtain wall to face of curtain wall and will be paid for at the contract unit price per linear foot, unless they are substituting for cast-in-place box culverts. In the event precast box culverts are substituted for cast-in-place box culverts, payment will be made at the contract unit price per cubic yard of concrete and per pound of reinforcing steel for the cast-in-place box culvert plan quantities. This price shall include designing, casting, reinforcing, sheeting, shoring, dewatering, installing, waterproofing, sealing joints, anchoring, disposing of surplus and unsuitable material, restoring existing surfaces, the upper 6 inches of bedding material within the neat lines shown on the Standard PB-1 drawings, fittings, and providing buffer zones and porous backfill for multiple lines. When not a pay item the cost of temporary stream relocation to facilitate the installation of the structure shall be included in the price for the box culvert. Minor Structure Excavation will be paid for in accordance with Section 303 of the Specifications.

SECTION 303—EARTHWORK

SS303-002016-02

January 17, 2017

Section 303.02(f) – Fabric used for Turbidity Curtains is inserted as follows:

Fabric used for Turbidity Curtains shall conform to Section 245.03(k).

Section 303.03(i) – Turbidity Curtain is replaced with the following:

Turbidity Curtain: This work consists of installation, maintenance, and removal of a turbidity curtain, including all necessary cables, weights, and floats in accordance with this provision and in conformity with the lines, grades and details shown on the Plans or established by the Engineer. The curtain shall be provided as a temporary measure to minimize the drift of suspended material during construction of the Project.

Type I turbidity curtain shall be used in protected areas that are sheltered from waves; and exposed only to light winds, and to current velocities of less than one foot per second.

Type II turbidity curtain shall be used in areas subject to small to moderate current velocities (up to 2 knots or 3.5 feet per second) or moderate wind and wave action.

TYPE III turbidity curtain shall be used in areas subject to considerable current (up to 3 knots or 5 feet per second), tidal action, or where the curtain is potentially subject to wind and wave action.

In locations with currents greater than 3 knots (5 feet per second) perpendicular to the barrier, or weather conditions that cause a turbidity barrier to be ineffective, a turbidity barrier shall not be used.

Floatation shall be flexible, buoyant units contained in a floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the required width of the curtain and maintain a freeboard of at least 3 inches above the water surface level, to a minimum of one foot above the bottom or a maximum ten foot depth at all stages of water levels.

Load lines shall be fabricated into the top and bottom of the curtain. The top load line shall consist of woven webbing or vinyl-sheathed steel cable and shall have a minimum break-strength of 9,800 pounds. The bottom load line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided if necessary to top load lines. The load lines shall have suitable devices, which develop the full breaking strength for connecting to load lines in adjacent sections.

The Contractor shall submit Working Drawings to the Engineer for review in accordance with Section 105.

The curtain shall be placed at the locations shown on the Plans and in accordance with the approved Working Drawings. The Contractor shall maintain the turbidity curtain in order to ensure the continuous protection of the waterway.

The curtain shall extend the entire depth of the watercourse whenever the watercourse is not subject to tidal action or significant wind or wave action. In tidal or wind-and-wave action situations, the curtain shall never touch the bottom. A minimum 1-foot gap shall be established between the weighted lower end of the skirt and the bottom at the mean low water.

Turbidity curtains installed in a navigable waterway shall be marked with lighted buoys that conform to U.S. Coast Guard regulations.

When the curtain is no longer required as determined by the Engineer, the curtain and related components shall be removed in such a manner as to minimize turbidity. The curtain and related components shall become the property of the Contractor and shall be removed from the project.

Section 303.06(e)20 – Turbidity Curtain is replaced with the following:

Turbidity curtain will be measured in linear feet from edge of the curtain along the support cable. Turbidity curtain will be paid for at the contract unit price per linear foot for the type specified. This price shall include design details, furnishing, installing, maintaining, and removal of all materials necessary to complete the work.

SECTION 313 – ASPHALT-STABILIZED OPEN-GRADED MATERIAL
SS313-002016-01 **August 7, 2017**

Section 313.02(c) – Asphalt Cement is replaced with the following:

Asphalt cement shall be PG 64H-22.

SECTION 315 – ASPHALT CONCRETE PLACEMENT
SS315-002016-01 **November 29, 2016**

Section 315.05(c) – Placing and Finishing is modified by replacing the third paragraph with the following:

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6 inches or more. The joint in the wearing surface shall be offset 6 inches to 12 inches from the centerline of the pavement if the roadway comprises two traffic lanes. The joint shall be offset approximately 6 inches from the lane lines if the roadway is more than two lanes in width. The longitudinal joint shall be uniform in appearance. If the offset for the longitudinal joint varies from a straight line more than 2 inches

in 50 feet on tangent alignment, or from a true arc more than 2 inches in 50 feet on curved alignment, the Contractor shall seal the joint using a waterproof sealer at no cost to the Department. The Contractor shall recommend a sealant and installation procedure to the Engineer for approval before proceeding. If the offset for the longitudinal joint varies from a straight line more than 3 inches in 50 feet on tangent alignment, or from a true arc more than 3 inches in 50 feet on curved alignment, the Engineer may reject the paving. The Engineer will not require offsetting layers when adjoining lanes are paved in echelon and the rolling of both lanes occurs within 15 minutes after laydown.

Section 315.05(g) – Rumble Strips is replaced with the following:

Rumble Strips: This work shall consist of constructing rumble strips or rumble stripes on mainline shoulders of highways by cutting concave depressions into existing asphalt concrete surfaces as shown on the Standards Drawings and as directed by the Engineer. Rumble stripes are defined as edgeline or centerline rumble strips with permanent longitudinal pavement markings subsequently installed within the rumble strip grooves.

Rumble strips and rumble stripes shall be installed in accordance with the RS-Series Standard Drawings. The Contractor shall demonstrate to the Engineer the ability to achieve the desired surface regarding alignment, consistency, and conformity with these specifications and the Standards Drawings prior to beginning production work on mainline shoulders or centerlines. The test site shall be approximately 25 feet longitudinally at a location mutually agreed upon by the Contractor and Engineer.

Rumble strips and rumble stripes shall be coated with liquid asphalt coating (emulsion) when the rumble strips or rumble stripes are being cut into an existing asphalt surface (i.e. more than one year since placement); when new rumble strips or rumble stripes are being cut into the pavement surface in conjunction with a surface treatment, latex emulsion, or slurry seal pavement operation; or when the proposed plant mix surface is less than one inch deep.

Liquid asphalt coating (emulsion) shall not be used when rumble strips or rumble stripes are being cut into new pavement, or being cut in conjunction with plant mix paving operations where the proposed plant mix surface is one inch or greater in depth.

When liquid asphalt coating (emulsion) is required, the Contractor shall coat the entire rumble strip area with the liquid asphalt coating (emulsion) using a pressure distributor following the cutting and cleaning of the depressions of waste material. For rumble strips installed on the shoulder, the approximate application rate shall be 0.1 gallons per square yard. When the rumble strip is installed along the centerline, the approximate application rate shall be

0.05 gallons per square yard. The application temperature shall be between 160 degrees F and 180 degrees F. For shoulder rumble strips only, overspray shall not extend more than 2 inches beyond the width of the cut depressions and shall not come in contact with pavement markings.

Pavement markings for rumble stripes shall be applied after the grooves have been cut. The grooves shall be thoroughly cleaned and the surfaced prepared prior to pavement marking application, in accordance with the Standard Drawings and Section 704. Overspray of pavement marking materials shall not extend more than one inch beyond the lateral position of the pavement marking line shown in the RS-Series Standard Drawings.

Rumble strips shall not be installed on shoulders of bridge decks, in acceleration or deceleration lanes, on surface drainage structures, or in other areas identified by the Engineer.

Waste material resulting from the operation shall be removed from the paved surface and shall not be disposed of where waterways may be at risk of contamination.

Section 315.08 – Measurement and Payment is amended by replacing the fourth paragraph with the following:

Tack coat, when a pay item, will be measured and paid for in accordance with Section 310. When not a pay item, it shall be included in the price for other appropriate pay items.

SECTION 317 – STONE MATRIX ASPHALT CONCRETE PLACEMENT
SS317-002016-01 **July 24, 2016**

Section 317.06 – Weather Restrictions is replaced with the following:

SMA mixture shall be placed only when the ambient and surface temperatures are 50 degrees F or above.

SECTION 401 – STRUCTURE EXCAVATION
SS401-002016-01 **April 5, 2017**

Section 401.03(i) – Backfilling is amended by replacing the second paragraph with the following:

The Contractor shall use select backfill material behind all abutments. The Department will include a detail indicating the limits (zone) of the select backfill in the Plans. The Contractor shall compact the material in accordance with Sections 305 and 303 respectively. The top surface of the backfill material shall be neatly graded.

Section 401.04 – Measurement and Payment is amended by replacing the thirteenth paragraph with the following:

Select backfill (Abutment zone) will be measured in tons and paid for at the contract ton price. This price shall include furnishing, placing, compacting, and grading select backfill material.

SECTION 403 – BEARING PILES

SS403-002016-01

June 7, 2016

Section 403.07(d) – Dynamic Formula is amended by replacing the equation with the following:

$$R_{ndr} = 1.75(E_d)^{0.5} \log_{10}(10N_b) - 100$$

where:

R_{ndr} = nominal pile resistance measured during pile driving (kips)

E_d = developed hammer energy. This is the kinetic energy in the ram at impact for a given blow. If ram velocity is not measured, it may be assumed equal to the potential energy of the ram at the height of the stroke, taken as the ram weight times the actual stroke (ft-lbs)

N_b = number of hammer blows for 1.0 in. of pile permanent set (blows/in.)

SECTION 404 – HYDRAULIC CEMENT CONCRETE OPERATIONS

SS404-002016-01

July 12, 2016

Section 404.02(a) – Concrete is amended by replacing the first paragraph with the following:

Concrete shall conform to Section 217 of the Specifications. Aggregate used in concrete for bridge decks shall be nonpolishing. All concrete shall be tested for permeability in accordance with Section 217 of the Specifications.

SECTION 406 – REINFORCING STEEL

SS406-002016-02

July 7, 2016

Section 406.03(c) – Fabrication is amended by replacing the first paragraph with the following:

Fabrication: Bent bar reinforcement shall be cold bent to the shape shown on the plans. Fabrication shall be in accordance with the ACI *Detailing Manual* – 2004 (SP-66-04).

Section 406.03(d) – Placing and Fastening is replaced with the following:

Placing and Fastening: Steel reinforcement shall be firmly held during the placing and setting of concrete. Bars, except those to be placed in vertical mats, shall be tied at every intersection where the spacing is more than 12

inches in any direction. Bars in vertical mats and in other mats where the spacing is 12 inches or less in each direction shall be tied at every intersection or at alternate intersections provided such alternate ties will accurately maintain the position of steel reinforcement during the placing and setting of concrete. Placing reinforcing steel in concrete after concrete has been freshly placed is not permitted.

Unless otherwise specified by the Engineer, tie wires used with corrosion resistant reinforcing steel can be: plastic; solid stainless; epoxy-coated carbon (black) steel wire; or plastic-coated carbon (black) steel wire.

The minimum clear distance from the face of the concrete to any reinforcing bar shall be maintained as specified in the table below.

Location	Minimum Cover (in)		
	Normal Condition	Corrosive Environment ¹	Marine ²
Pier caps, bridge seats and backwalls:			
Principal reinforcement	2-3/4	3-3/4	4
Stirrups and ties	2-1/4	3-1/4	3-1/2
Pier caps, bridge seats and backwalls (at open joint locations):			
Principal reinforcement	3-3/4	3-3/4	4
Stirrups and ties	3-1/4	3-1/4	3-1/2
Footings and pier columns:			
Principal reinforcement	3	4	4
Stirrups and ties	2-1/2	3-1/2	3-1/2
Cast-in-place deck slabs:			
Top reinforcement ³	2-1/2	2-1/2	2-1/2
Bottom reinforcement	1-1/4	1-1/4	2
Precast and cast-in-place slab spans:			
Top reinforcement ³	2-1/2	2-1/2	2-1/2
Bottom reinforcement	2	2	3
Prestressed slabs and box beams:			
Top steel	1-3/4	1-3/4	1-3/4
Stirrups and ties	1-1/8	1-1/8	1-1/8

Reinforcement concrete box culverts and rigid frames with more than 2 ft. fill over top of slab:			
Top slab – top reinforcement	1-1/2	2-1/2	3
Top slab – bottom reinforcement	1-1/2	2-1/2	3
Inside walls and bottom slab top mat	1-1/2	2-1/2	3
Outside walls and bottom slab bottom mat	1-1/2	2-1/2	3
Reinforcement concrete box culverts and rigid frames with less than 2 ft fill over top of slab:			
Top slab – top reinforcement	2-1/2	2-1/2	3
Top slab – bottom reinforcement	2	2-1/2	3
Inside walls and bottom slab top mat	1-1/2	2-1/2	3
Outside walls and bottom slab bottom mat	1-1/2	2-1/2	3
Rails, rail posts, curbs and parapets:			
Principal reinforcement	1-1/2	1-1/2	1-1/2
Stirrups, ties and spirals	1	1	1
Concrete piles cast against or permanently exposed to earth (not applicable for prestressed concrete):			
	3	3	3
Drilled shafts:			
Principal reinforcement	4	5	5
Ties and spirals	3-1/2	4-1/2	4-1/2
All other components not indicated above:			
Principal reinforcement	2-1/2	3-1/2	3-1/2
Stirrups and ties	2	3	3

¹Corrosive environment affects cover where concrete surface is in permanent contact with corrosive soil.

²Marine includes all locations with direct exposure to brackish and salt water.

³Includes 1/2 inch monolithic (integral) wearing surface.

Bars that must be positioned by maintaining clearances from more than one face shall be centered so that clearances indicated by the plan dimension of bars are equalized.

Bars shall be placed so that the concrete cover as indicated on the plans will be maintained within a tolerance of 0 to +1/2 inch in the finally cast concrete.

Where anchor bolts interfere with reinforcing steel, the steel position shall be adjusted without cutting to permit placing anchors in their proper locations.

Plastic (composite) chairs may be used to support Corrosion Resistant Reinforcement (CRR) in precast concrete elements; otherwise, CRR in structures shall be supported by steel bar supports as follows, unless otherwise specified by the Engineer:

1. For Class I CRR, steel bar supports shall be: plastic-protected wire bar supports (per CRSI Class 1 – Maximum Protection) when stay-in-place forms are not used and the steel bar support will be exposed; and epoxy-coated bright basic wire bar supports (per CRSI Class 1A – Maximum Protection) when either stay-in-place forms are used or the steel bar support will not be exposed.
2. For Class II and Class III CRR, steel bar supports shall be: either stainless steel wire bar supports or plastic-protected wire bar supports (per CRSI Class 1 – Maximum Protection) when stay-in-place forms are not used and the steel bar support will be exposed; and epoxy-coated bright basic wire bar supports (per CRSI Class 1A – Maximum Protection) when either stay-in-place forms are used or the steel bar support will not be exposed.
3. Steel bar supports for CRR shall be fabricated from cold-drawn carbon steel wire conforming to the CRSI corrosion protection class listed above for their specific use, except for plastic-protected wire bar supports, which shall be epoxy-coated with plastic protection applied by dipping legs (i.e., capping legs with premolded plastic tips is prohibited).

Carbon (black) steel in structures shall be supported by bright basic wire bar supports (per CRSI Class 3 – No Protection), except when cast-in-place members are cast directly on soil or rock, such as footings and approach slabs. In these cases, precast concrete supports and plastic (composite) chairs may be used. Steel bar supports for carbon (black) steel shall be fabricated from cold-drawn carbon steel wire. Precast concrete bar supports shall have a 28-day design compressive strength of at least 4,500 pounds per square inch and shall be furnished with plastic ties or shaped to prevent slippage from beneath the reinforcing bar.

Side form spacers shall meet the same corrosion protection level as the bar supports.

Bar supports for CRR in bridge decks and slab spans shall be spaced as recommended by CRSI but not more than 4 feet apart transversely or longitudinally. The mat of steel reinforcement closest to the surface shall be

supported by bolster supports or individual chair bar supports and intermediate and upper mats can be supported by individual high chair bar supports or continuous bar supports placed between mats. When the upper mat is supported by the bottom mat (e.g., using continuous bar supports placed between mats), all the bar supports shall be spaced as recommended by CRSI but not more than 3 feet apart transversely or longitudinally. Bar supports shall be firmly stabilized so as not to displace under construction activities. Standees (a bar bent to a U-shape with 90 degree bent legs extending in opposite directions at right angles to the U-bend acting as a high chair resting on a lower mat of reinforcing bars to support an upper mat) may be used on simple slab spans provided they hold the reinforcing steel to the requirements specified herein and are firmly tied to the lower mat to prevent slippage. The use of standees will not be permitted for the top mat of steel on any continuous slab spans.

In reinforced concrete sections or elements other than bridge decks and slab spans, the specified clear distance from the face of concrete to any reinforcing bar and the specified spacing between bars shall be maintained by means of approved types of stays, ties, hangers, or other supports adhering to the CRSI corrosion protection classes and specific uses listed above. The use of pieces of gravel, stone, brick, concrete, metal pipe, or wooden blocks will not be permitted as supports or spacers for reinforcing steel. The clear distance between bars shall be at least 1 1/2 times the specified maximum size of coarse aggregate but not less than 1 1/2 inches. Before concrete is placed, the Engineer will inspect reinforcing steel and determine approval for proper position and the adequacy of the method for maintaining position.

Section 406.03(e) – Splicing and Lapping is amended by replacing the fourth paragraph with the following:

For corrosion resistant reinforcing bars, mechanical butt splicers shall be of the same material as the bars being spliced.

**SECTION 413 – DISMANTLING AND REMOVING EXISTING STRUCTURES
OR REMOVING PORTIONS OF EXISTING STRUCTURES
SS413-002016-01 August 30, 2017**

Section 413.02(c) – Environmental and Worker Protection is replaced with the following:

Environmental and Worker Protection: Heating, welding, flame cutting, grinding, chipping, needle gun cleaning, manual scraping, heat gun cleaning, drilling, straightening, and other construction operations, or demolition of Type B structures, as defined in Section 411.01, that disturbs areas coated with a hazardous material shall require environmental and worker protection.

1. **Environmental protection** shall be in accordance with Section 411.09 except the Department will allow a Certified Industrial Hygienist to perform the required duties of the SSPC QP-2 Certified Competent Person for work involving the removal of protective coating from a Type B structure where no coating operations will be conducted in the disturbed coating areas. The Department will not require the Contractor to submit and implement an environmental protection plan as specified in Sections 411.09(a) and 411.09(b) for work involving the removal of 100 square feet or less of protective coating from a Type B structure. However, the Contractor shall comply with applicable local, state, and federal codes and regulations and shall employ appropriate measures to prevent the release of hazardous materials into the environment. Determination of the total square footage of removal area shall not include the cumulative area of coating disturbance from removal of bolts. The Contractor shall dispose of hazardous materials generated from his demolition according to Sections 411.09(c) and 411.09(d).

2. **Worker health and safety protection** shall be accomplished according to Section 411.10 except the Department will allow a Certified Industrial Hygienist to perform the required duties of the SSPC QP-2 Certified Competent Person for work involving the removal of protective coating from a Type B structure where no coating operations will be conducted in the disturbed coating areas. The Department will not require the Contractor to submit and implement a worker health and safety protection plan as specified in Sections 411.10(a) and 411.10(b) for work involving the removal of 100 square feet or less of protective coating from a Type B structure. However Contractor shall comply with other applicable codes and regulations regarding public and worker health and safety.

Except when not required by size of removal areas, the Contractor shall submit a written statement to the Engineer, complete with all revisions including notations of any areas of noncompliance and corrective actions taken, that certifies both the Environmental Protection Plan and the Worker Health and Safety Plan were fully implemented as detailed during the performance of the work covered by this specification upon completion of the project.

SECTION 431 – EPOXY BRIDGE DECK OVERLAYS

SS431-002016-01

May 22, 2017

Section 431.02(a) – Fine aggregate is replaced with the following:

Fine aggregate shall conform to Section 243.

SECTION 505 – GUARDRAIL AND W-BEAM MEDIAN BARRIERS

SS505-002016-02

March 15, 2017

Section 505.03 – Procedures is amended to replace the sixteenth paragraph with the following:

The Contractor shall submit two copies of the manufacturers' recommended installation instructions and the FHWA NCHRP 350 or MASH approval letter for the type of new or salvaged guardrail end treatments being installed on the project to the Engineer at least 2 weeks before starting guardrail end terminal installation. All end terminals shall be from manufacturers on the Materials Division's Approved Products List 12 and the VDOT NCHRP 350 or MASH approved list linked in List 12. New Type I Re-Directive Impact Attenuators and Guardrail Terminals shall be permanently identified by stamping or engraving in a location readily visible for inspection that is not susceptible to damage. The identification shall include Manufacturer, Date and Site of Manufacture, and Model Number.

Section 505.03(d) – Adjusting existing guardrail is amended by replacing the first paragraph with the following:

Adjusting existing guardrail beam shall consist of removing and disassembling the existing guardrail beam and offset blocks from the posts, drilling the post in accordance with the standard drawing, and reassembling the offset blocks and guardrail beam to the height required by current Standard Drawings or Specifications. Adjusting the existing guardrail beam shall be limited to 4 inches. Adjusting guardrail beam shall be limited to steel posts and shall be in accordance with the plan details and Standard Drawings. Adjusting existing guardrail beam will not be permitted within the pay limits of end terminals. The terminal shall be completely removed and reinstalled or a new terminal installed in accordance with the Standard Drawings and the manufacturer's instructions.

Adjusting existing guardrail to meet the GR-MGS1 or GR-MGS1A Standard Drawings will not be permitted.

Section 505.04 – Measurement and Payment is amended by replacing the fifth paragraph with the following:

Terminal treatment or end anchorage for beam guardrail, cable guardrail, and steel median barriers terminating on the roadway side of the ditch line will be measured in units of each and will be paid for at the contract unit price per each.

Section 505.04 – Measurement and Payment is amended by inserting the following:

Guardrail height transition (Standard) will be measured in units of each and will be paid for at the Contract each price. This price shall include

furnishing and placing posts, offset blocks, and all hardware necessary to fully install the height transition.

Section 505.04 – Measurement and Payment is amended by revising the Pay Item Table as follows:

The following pay items are inserted:

Pay Item	Pay Unit
Guardrail end anchorage (Standard)	Each
Guardrail height transition (Standard)	Each

SECTION 512 – MAINTAINING TRAFFIC

SS512-002016-01

May 24, 2016

Section 512.01 – Description of the Specifications is replaced with the following:

This work shall consist of maintaining traffic and protecting workers through temporary work areas, maintaining public and private entrances and mailbox turnouts, constructing and obliterating temporary traffic Diversions, providing positive guidance to the traveling public within the limits of the work area and over approved traffic Detours. All work shall be in accordance with the VWAPM, the MUTCD, and the Contract, as directed by the Engineer.

Section 512.02(f) – Temporary (Construction) signs is replaced with the following:

Temporary (Construction) signs for traffic control during construction, maintenance, permits, utility, and incident management activities shall have retroreflective sign sheeting in accordance with Sections 247 and 701 of the Specifications, and shall be installed in accordance with Section 701 of the Specifications.

Sign substrates for rigid temporary (construction) signs mounted on posts and temporary (construction) sign panels for overlays shall be either fabricated of aluminum at least 0.080-inches thick, conforming to Section 229.02(a) of the Specifications, or one of the following from the Traffic Engineering Division's Approved Products List: 0.4-inch-thick corrugated polypropylene; 0.4-inch-thick corrugated polyethylene plastic; or 0.079-inch-thick aluminum/plastic laminate. Sign substrates shall be smooth, flat, and free of metal burrs or splinters.

Sign substrate materials for signs mounted on drums, Type 3 barricades, and portable sign stands shall be as specified below and shall be the same material that was used when the device was tested and found to be in compliance with the requirements of National Cooperative Highway

Research Program (NCHRP) Report 350, Test Level 3, or of other materials allowed in the FHWA acceptance letter. Drums, Type 3 barricades, and portable sign stands shall be from Location & Design Division's NCHRP 350/MASH Approved Products List.

Sign Substrates for Type 3 Barricades and Portable Sign Stands

Rollup sign

0.4 inch thick corrugated polypropylene or polyethylene plastic

0.079 inch thick aluminum/plastic laminate

Sign Substrates for Drums

0.4 inch thick corrugated polypropylene or polyethylene plastic

Section 512.03 – Procedures is amended by replacing the seventh paragraph with the following:

The color of Automated Flagger Assistance Device trailers, arrow board trailers, portable traffic control signal trailers, Intelligent Traffic Systems (ITS) trailer equipment, and portable changeable message sign trailers and sign frames shall be either Virginia highway orange (DuPont Color No. LF74279 AT or color equivalent) or federal yellow. The back traffic facing trailer frame, where the signal and brake lights are located, shall be fully covered with 2 inch high retroreflective sheeting conforming to Section 247.02(c) of the Specifications. The sheeting shall have alternating 11 inch wide vertical red stripes and 7 inch wide vertical white stripes.

Section 512.03(g)2b(1) – Drums is amended to replace the third paragraph with the following:

Drums shall be used in all unmanned work zone locations and shall also be used to delineate the locations of all non-crashworthy trailer mounted devices such as, but not limited to, ITS devices, Portable Changeable Message Sign, Highway Advisory Radio, Speed Trailers, CB Wizards, etc. as well as light towers. Drums shall be used to delineate merging tapers on limited access highways during nighttime operations and the location of Electronic Arrow Boards.

Portable Traffic Control Signals and AFAD units shall be delineated in accordance with the VWAPM.

Section 512.03(l) – Eradicating Pavement Markings is amended to replace the fourth paragraph with the following:

The Contractor may submit other methods of eradication for the Engineer's approval. The Contractor shall minimize roadway surface damage when performing the eradication. The Contractor shall repair the pavement if eradication of pavement markings results in damage to or deterioration of the

roadway presenting unsafe conditions for motorcyclists, bicyclists, or other road users. Pavement repair, when required, shall be performed using a method approved by the Engineer.

Section 512.04 – Measurement and Payment is amended to replace the fourteenth paragraph with the following:

Temporary traffic control signal will be paid for at the contract lump sum price for the location specified in the contract documents. This price shall include, but not be limited to, supports; span wire; tether wire; conduit; conductor cable; traffic signal heads; backplates; hanger assemblies; necessary control items; vehicle detection; uninterruptable power supply; channelizing devices; and, when approved, portable traffic control signal equipment. The price shall also include installing, maintaining, adjusting, and aligning signal equipment; when required plan development, inclusive of signal layout, signal timing, phasing, and/or sequencing; providing electrical service; utility company costs; and removing temporary signal equipment when no longer required.

Section 512.04 – Measurement and Payment is amended to replace the seventeenth paragraph with the following:

Temporary (Construction) Pavement message (word) markings will be measured in units of each character for the height specified and for type or class material specified and will be paid for at the contract unit price per each character. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials (when required), and warranty.

Temporary (Construction) Pavement symbol markings will be measured in units of each per location for the symbol and type material specified and will be paid for at the contract unit price per each. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials when required, and warranty.

Section 512.04 – Measurement and Payment is amended to replace the nineteenth paragraph with the following:

Eradication of existing linear pavement markings will be measured in linear feet of a 6 inch width or portion thereof as specified herein. Widths that exceed a 6 inch increment by more than 1/2 inch will be measured as the next 6 inch increment. Measurement and payment for eradication of existing pavement markings specified herein shall be limited to linear pavement line markings. Eradication of existing pavement markings will be paid for at the

contract unit price per linear foot. This price shall include removing linear pavement line markings, cleanup, and disposing of residue.

Section 512.04 – Measurement and Payment is amended by revising the Pay Item Table as follows:

The following pay items are removed:

Pay Item	Pay Unit
Temporary pavement message marking (Type and message)	Each
Eradication of existing pavement marking	Linear foot

The following pay items are inserted:

Pay Item	Pay Unit
Temporary pavement message marking (Size character, Type or class material)	Each
Temporary pavement symbol marking (Symbol, Type or class material)	Each
Eradication of existing linear pavement marking	Linear foot

SECTION 516 – DEMOLITION OF BUILDINGS AND CLEARING PARCELS
SS516-002016-01 **March 8, 2016**

Section 516.02(d) – Demolition is amended by replacing the first paragraph with the following:

The Department will issue written notification to the Contractor when buildings are ready for demolition. Demolition shall include removing and disposing of materials from buildings and appurtenances down to ground level. If the structure includes a basement, concrete slab, or any other elements which extend below the ground, exclusive of piles, then demolition shall include removing and disposing of the materials down to, and including, this portion of the structure as directed by the Engineer.

Section 516.02(e) – Clearing Parcels is amended by replacing the second paragraph with the following:

Clearing parcels shall include disposing of materials from abandoned, noncombustible foundations down to and including floor slabs, basement slabs, and any improvement or appurtenance designated for removal but not listed as a pay item. Foundations for buildings designated as pay items will be considered part of those buildings, and removed according to paragraph (d) above. Combustible debris and rubble, including fences, posts, or pillars shall be removed from the right of way or from within the limits of easements obtained for removing buildings that may be partially outside the right of way.

SECTION 700 – GENERAL

SS700-002016-02

August 10, 2017

Section 700.02(a) – Concrete is replaced with the following:

Concrete shall be Class A3 conforming to Section 217 of the Specifications.

Section 700.02(c) – Dissimilar metals is replaced with the following:

Dissimilar metals - The contact surfaces between dissimilar metals shall be isolated with an approved durable nylon washer, gasket, or other approved isolation material to prevent corrosion, except that isolation material shall not be used in conjunction with mast arm hanger assemblies, nor shall isolation materials be used on square tube post structures.

Section 700.02(j) – Breakaway support systems is replaced with the following:

Breakaway support systems shall conform to National Cooperative Highway Research Program (NCHRP) Report 350 or Manual for Assessing Safety Hardware (MASH) testing requirements. The Contractor shall provide a copy of the FHWA certification letter for the brands and models of breakaway systems planned for use.

Breakaway couplers will not be permitted.

The following materials shall be used when breakaway support systems are specified on the plans:

1. **Frangible bases** shall be aluminum.
2. **Slip bases** shall be galvanized steel or other approved noncorrosive metal.

Section 700.03 – General Requirements is replaced with the following:

Cable wiring holes in traffic control device and ITS device structures shall be deburred and rounded, or fitted with a grommet. Damaged galvanization shall be repaired in accordance with Section 233. The size of the hole shall not exceed the sum of the diameter of the cables plus 1/2-inch.

The design of traffic control device and ITS device structures and foundations shall conform to AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 6th Edition (LTS-6), 2013 with 2015 interims*, as modified elsewhere in the Contract.

In addition, structures and foundations shall be designed as per the following:

(a) **Sign Structures:**

Overhead Sign and Dynamic Message Sign (DMS) Structures (Span, Cantilever, Butterfly, etc.) shall be fabricated from galvanized steel material as specified herein. Aluminum structures will not be allowed. Base plates for overhead sign structures shall have at least the minimum number and diameter of anchor bolts specified in the Standard Drawings. Washers are required above and below the base plate. Tubular pole shafts shall have a removable cap fastened by at least three screws.

Ground Mounted Sign Structures shall be fabricated from galvanized steel unless otherwise indicated. Square tube posts shall conform to ASTM A1011, Grade 50 except the yield strength after cold-forming shall be 60,000 psi minimum for 12 and 14 gauge posts, and 55,000 psi minimum for 10 gauge posts. Posts (inside and outside) shall be galvanized in accordance with ASTM A653, Coating Designation G-90. Square tube sign posts shall have 7/16-inch (\pm 1/64-inch) openings or knockouts spaced 1-inch on centers on all four sides.

(b) **Lighting Structures** shall be of a one-piece or sectional single unit, tubular form, and shall be round or multisided. Multisided poles shall have at least eight sides. Pole shafts shall have a removable cap fastened by at least three screws.

1. **High Mast Lighting Structures** (Lengths of 55 feet or greater) shall be galvanized steel and shall have at least the minimum number and diameter of anchor bolts specified in the Standard Drawings. Aluminum structures will not be allowed. Washers are required above and below the base plate.

2. **Conventional Lighting Structures** (Lengths less than 55 feet) shall be galvanized steel or aluminum and shall have at least the minimum number and diameter of anchor bolts specified in the Standard Drawings.

(c) **Signal Poles and Mast Arms** shall be galvanized steel of a one-piece or sectional single unit, tubular form, and shall be round or multisided. Multisided poles shall have at least eight sides. Pole shafts and mast arms shall have a removable cap fastened by at least three screws. If field adjusting of mast arm length is required, the end cap shall snugly fit the arm after adjustment

1. **Mast Arm Signal Poles:** The mast arms shall not deflect below the horizontal plane or below the minimum vertical clearance after the Standard Drawing MP-3 maximum loads are applied. The rise shall

not exceed 3 percent of the mast arm length after the loads identified on the plans are applied, unless otherwise directed by the Engineer.

The flange plate and pole shall have a 4 inch wiring hole centered in the pattern that is deburred and rounded or fitted with a grommet. Mast arms shall be secured to the pole with thru-bolt, nuts, and washer connections. The flange plate shall be continuously welded to gusset and side plates. Gusset and side plates shall be continuously welded to the pole and each other. The flange plate shall be parallel to the axis of the pole. Flange plates for mast arm poles with two arms shall be positioned 90 degrees to each other. The flange plate shall be designed to receive a minimum of eight 1.5-inch diameter bolts for attachment of the arm.

Foundations for mast arm signal poles shall be designed in accordance with Standard Drawing PF-8 for the specified pole length and mast arm length shown on the Plans. Foundations shall also be designed for the greater of either the mast arm loadings and placement of loads shown on the Plans, or the Standard Drawing MP-3 design loadings for that arm length.

Mast arm poles shall have a round base plate and at least the minimum number of anchor bolts specified in the Standard Drawings. Washers are required above and below the base plate.

Mast arm pole types shall be in accordance with the following table. The poles shall be designed to support the maximum design loading allowed for that pole type, in accordance with the following table and Standard Drawing MP-3. The arms shall be designed to support the maximum design loading allowed for that mast arm length depicted in Standard Drawing MP-3.

Pole Type	# of arms	Maximum Allowable Loading as per Standard Drawing MP-3	Luminaire arm?	Length of Pole (top of pole to bottom of base plate)
A	1	49 ft Loading Standard	No	19
B1	1	75 ft Case 1 Loading Standard	No	19
B2	1	75 ft Case 2 Loading Standard	No	19

C	2 (mounted at 90° to each other)	70 ft Loading Standard & 60 ft Loading Standard	No	19
D	1	49 ft Loading Standard	Yes	25
E1	1	75 ft Case 1 Loading Standard	Yes	25
E2	1	75 ft Case 2 Loading Standard	Yes	25
F	2 (mounted at 90° to each other)	70 ft Loading Standard & 60 ft Loading Standard	Yes	25

Mast arms and poles shall be designed such that arm lengths greater than 49 feet in length cannot be mated to Type A or Type D poles. Mast arms shall not be attached to poles that have not been designed to support that length of mast arm.

Type D, E1, E2, and F poles, and the foundations for those poles, shall also be designed to support a maximum 18' luminaire arm supporting a 22-pound video camera with 1 square foot of wind load area concentrated 1 foot from the end of arm, and a 35-pound luminaire with 1 square foot of wind load area located at the end of the arm.

2. **Strain Signal Poles** shall be erected on foundations designed in accordance with Standard Drawing PF-8. They shall be galvanized steel and have a round base plate designed for at least the minimum number and diameter of anchor bolts specified in Standard Drawing PF-8. Washers are required above and below the base plate. The structure and the foundation shall be designed for the loads shown on the plans. Strain signal poles shall be field drilled for the attachment of span wire and tether wire. Span wire shall be located at least 18 inches below the top of the pole. All loads shall be assumed to be tethered and no load reduction for breaking of the tether wire shall be used in the pole design.
3. **Pedestal Signal Poles** shall be aluminum 6061-T6 structural tubes with minimum 0.337-inch wall thickness.
4. **Luminaire arms** attached to signal poles shall be galvanized steel, and shall be as specified in Standard Drawing MP-3. Luminaire arms shall be truss-style arms.

- (d) **Camera Poles** for the support of ITS equipment shall be galvanized steel of a one-piece or sectional single unit, tubular form, and shall be round or multisided. Multisided poles shall have at least eight sides. They shall have at least four (4) anchor bolts.
- (e) **Remove Existing Sign Panels or Sign Structures:** Items designated to be removed shall be disposed of in accordance with Section 106.04.

All foundations shall be removed to a point at least 2 feet below finished grade. The Contractor shall fill and compact the resulting cavities, and restore the area with topsoil, grading, seed, fertilizer, or lime as necessary.

All new signs in a particular sequence giving similar directions shall be installed before existing signs are removed.

Where a sign support is located on a bridge structure, or other such structure where the foundation cannot be removed, the existing anchor bolts shall be cut flush with the top of the structure and sealed with a two-part epoxy resin to prevent the remaining bolts from corroding.

When an overhead sign structure is attached to a bridge parapet, the existing anchor bolts shall be mechanically cut flush with the surface of the parapet, removed by mechanical drilling to a depth of one-half inch below the surface of the parapet, and patched to match the color and texture of the existing parapet surface with hydraulic cement mortar or grout in accordance with Section 410. Connection bolts to the steel beams shall be removed and voids shall be filled at the direction of the Engineer.

When an existing sign structure has lights or beacons, then electrical service shall be disengaged at the nearest junction box, and all conductors shall be capped and sealed in place unless service is to be reused for electrical service for the replacement structure.

When an existing sign panel is being removed in order to facilitate its replacement with a new sign panel, then the existing sign panel shall be removed immediately before installing the new sign panel in order to maintain continuity of signing, unless otherwise directed by the Engineer.

When an existing sign structure is being replaced with a new sign structure, then the new sign structure shall be erected immediately behind the existing sign structure before removing the existing sign structure in order to maintain continuity of signing, unless otherwise directed in the Plans or by the Engineer.

- (f) **Relocate Existing Sign Panels:** Sign panels designated to be relocated shall be removed from their existing locations and reinstalled at the locations indicated in the Contract. Existing framing and bracing members shall be reused at the new sign location unless otherwise directed by the Engineer.

Sign panels shall be reinstalled immediately following removal from their existing location, unless otherwise approved by the Engineer.

Sign panels shall be attached to their new location using new attachment hardware in accordance with the Standard Drawings and the Specifications.

Any sign panels that are scratched or damaged during the relocation process shall be replaced at no additional cost to the Department.

Section 700.04 – Working Drawings is amended to replace the last paragraph with the following:

The Contractor's engineer shall verify that the proposed traffic control device or ITS device foundations and structures are designed in accordance with the requirements of the Plans, Specifications, Standard Drawings, and the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 6th Edition (LTS-6), 2013 with 2015 interim*, as modified elsewhere in the Contract; based on site conditions, required loadings, and required vertical clearances.

Section 700.05(c) – Concrete Foundations is amended to replace the seventh paragraph with the following:

The Contractor shall furnish the foundation designs for signal poles, high-mast lighting poles, overhead sign structures, and camera poles to the Engineer for review. Such designs shall be supervised and sealed by a Professional Engineer holding a valid license to practice engineering in the Commonwealth of Virginia. Design calculations and drawings shall indicate the cubic yard quantity of concrete required for constructing the foundations. The foundations shall be designed for the structure it is supporting and for the loads the structure is being designed to support, unless indicated otherwise on the plans.

Section 700.05(d) – Electrical Service is amended to replace the second and third paragraph with the following:

When required on the Standard Drawings, the Plans, or as directed by the Engineer, the Contractor shall construct an electrical service work pad in front of all electrical service safety switches, breaker boxes, and pole mounted cabinets, except when an immediately adjacent paved sidewalk can

fulfill this purpose. The electrical service work pad shall be at least 20 inches in width, 36 inches in length, and 4 inches in depth, and sloped to facilitate drainage away from the structure. Exposed concrete areas of electrical service work pads shall be given a Class 7 finish in accordance with Section 404 of the Specifications.

Section 700.05(e) – Poles, posts, sign structures, and ITS structures is amended to replace the fifth paragraph with the following:

All signal poles, light poles not mounted on transformer bases, camera poles, and overhead sign structures shall be provided with handholes that are on the opposite side from traffic. Handholes shall be at least 3 by 5 inches, unless otherwise specified in the Standard Drawings, and shall be provided with a weatherproof gasket and cover. Handholes shall be latchable, capable of being opened using a star wrench or other approved latching mechanism. If specified in the Contract Documents, a lockable handhole cover shall be provided, using key requirements provided by the VDOT Regional Operations Maintenance Manager.

For structures mounted on transformer bases, the transformer bases shall have hinged access covers on the side opposite traffic. The Contractor shall furnish the Engineer with at least one tool or key required to open handholes and transformer base access covers for each 40 structures, or fraction thereof.

Section 700.05(f) – Breakaway Support Systems is replaced with the following:

Breakaway Support Systems Breakaway support systems shall be installed where specified on the plans and installed according to the manufacturer's instructions. Breakaway support systems shall not be used for poles that support electrical power service equipment.

Section 700.06 – Measurement and Payment is amended to replace the first paragraph with the following:

Concrete foundations will be measured units of each or cubic yards and will be paid for at the contract unit price per each or cubic yards of concrete as applicable for the standard, type and size designated. When paid for in cubic yards of concrete, no payment will be made for concrete in excess of the cubic yards of concrete required by the approved foundation design unless otherwise authorized by the Engineer, in which case the additional concrete will be paid for in cubic yards for the invoice material cost only. This price shall include providing foundation design and shop drawings; concrete, reinforcing steel, anchor bolts, washers, nuts, bolt circle templates, lubricant, torque, ultrasonic test on anchor bolts, grounding electrodes (including grounding electrode clamps, grounding electrode conductors, and

installation), conduits, testing grounding conductor-to-electrode continuity, excavating, backfilling, compacting, vented varmint screens, disposing of surplus and unsuitable material, and restoring disturbed areas.

Section 700.06 – Measurement and Payment is amended to replace the ninth through the twelfth paragraph with the following:

Lighting poles will be measured in units of each and will be paid for at the contract unit price per each for the standard and luminaire mounting height or type specified. This price shall include providing design and shop drawings; pole shafts, grounding lugs, handholes, locks (when required), caps, identification tags, base plates, vibration dampeners (when required), bracket arms, breakaway support systems, field drilling, and galvanization.

Steel strain poles will be measured in units of each and will be paid for at the contract unit price per each for the length specified. This price shall include providing design and shop drawings, pole shafts, J-hooks, grounding lugs, handholes, locks (when required), caps, fittings, identification tags, field drilling, and galvanization.

Mast arm signal poles will be measured in units of each and will be paid for at the contract unit price per each for the standard and type specified. This price shall include providing design and shop drawings, pole shafts, J-hooks, grounding lugs, handholes, locks (when required), caps, fittings, base plates, identification tags, field drilling, and galvanization.

Mast arms will be measured in units of each and will be paid for at the contract unit price per each for the length and loading case (when required) specified. The price bid shall include providing design and shop drawings, mast arms including mast arms caps, galvanization, fittings, nuts, bolts, washers, field drilling of wire outlet holes and rubber gaskets or grommets, field adjustment of arm lengths, and identification tags.

Overhead sign structures will be measured in units of each and will be paid for at the contract unit price per each for the location specified. The price shall include furnishing design and shop drawings, structural units and supports, field drilling and adjustment, galvanization, base plates, handholes, locks (when required), caps, grounding lugs, electrical systems including conduit, sign luminaires, luminaire supports, fittings, conductor cable, and identification tags.

Section 700.06 – Measurement and Payment is amended to replace the sixteenth paragraph with the following:

Pedestal poles will be measured in units of each and will be paid for at the contract unit price per each for the standard and length specified. This price

shall include caps, breakaway support systems, hinged access covers, galvanization, grounding lugs, identification tags, and anchor bases.

Section 700.06 – Measurement and Payment is amended to insert the following:

Remove Existing (Type) Sign Structure will be measured in units of each and paid for at the Contract each price for the type of structure specified. This price shall include removing and disposing of the existing sign structure and all supported sign panels, conduits, cables, lights, luminaires, and luminaire retrieval system attached to the structure; disengaging existing electrical service; and capping and sealing conductors. This price shall also include excavating, demolishing and removing foundational elements to at least two feet below ground line; disposing of waste materials; backfilling with suitable materials; compacting; and restoring (grading, topsoiling and seeding). For removal of overhead sign structures, this price shall also include cutting existing anchor bolts, capping and sealing, hydraulic cement mortar or grout, and epoxy resin.

Remove Existing (Type) Sign Panel will be measured in units of each and paid for at the Contract each price for the type of sign panel specified. This price shall include removing and disposing of the existing sign panel, framing and bracing, luminaires, conductor cables, and attachment hardware.

Relocate Existing (Type) Sign Panel will be measured in units of each and paid for at the Contract each price for the type of sign panel specified. This price shall include removing sign panel, furnishing new mounting hardware and brackets, and installing onto new structure.

Section 700.06 – Measurement and Payment is amended by revising the Pay Item Table as follows:

The following pay items are removed:

Pay Item	Pay Unit
Lighting pole (Standard, luminaire mounting height)	Each
Signal pole (Standard, class and type)	Each
Mast arm (Length)	Each

The following pay items are inserted:

Pay Item	Pay Unit
Lighting pole (Standard, luminaire mounting height or type)	Each
Signal mast arm pole (Standard and type)	Each
Steel strain pole (Standard and length)	Each
Mast arm (Length) (loading case)	Each
Remove existing (type) sign structure	Each

Remove existing (type) sign panel	Each
Relocate existing (type) sign panel	Each

SECTION 704 – PAVEMENT MARKINGS AND MARKERS

SS704-002016-02

February 3, 2017

Section 704.01 – Description is replaced with the following:

This work shall consist of establishing the location of retroreflective pavement markings and installing pavement markings and pavement markers in accordance with the *MUTCD*, the Contract, and as directed by the Engineer.

Section 704.02(d) – Contrast Pavement Markings is inserted as follows:

Contrast Pavement Markings shall conform to Section 246 of the Specifications.

Section 704.03(a)2 – Type B markings is amended to replace the first paragraph with the following:

Type B markings shall be applied in accordance with the manufacturers' installation instructions.

Section 704.03(a)2e – Patterned preformed tape (Class VI) is amended to replace the third, fourth, and fifth paragraph with the following:

The Contractor shall ensure that markings are not degraded by subsequent operations. Markings that are improperly inlaid during the pavement operations shall be completely eradicated and reapplied via non-embedded surface application at the Contractor's expense.

Surface-applied Type B Class VI markings shall not be installed directly over existing markings, except that Type B Class VI markings may be installed over Type A markings that are fully dry and are at a thickness of 10 mils or less.

Section 704.03(a)2f – Polyurea (Class VII) is replaced with the following:

Polyurea (Class VII) shall be applied in accordance with the manufacturer's installation instructions. Polyurea marking material shall not be applied over existing pavement markings unless the existing marking is 90 percent worn away or eradicated; or over Type A markings that are fully dry and are at a thickness of 10 mils or less.

Polyurea marking material shall be applied at a wet film thickness of 20 mils (± 1 mil). Glass beads and retroreflective optics shall be applied at the rate

specified in the VDOT Materials Division's Approved Products List 74 for the specific polyurea product.

Section 704.03(b) – Pavement messages and symbols markings is amended to replace the second paragraph with the following:

Message and symbol markings include, but shall not be limited to, those detailed in Standard Drawing PM-10.

Section 704.04 – Measurement and Payment is amended to replace the second paragraph with the following:

Contrast Pavement Line Marking will be measured in linear feet and will be paid for at the Contract unit price per linear foot for the type or class and width specified. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials when required, and warranty.

Pavement message markings will be measured in units of each per location or in linear feet as applicable and will be paid for at the Contract unit price per each or linear foot. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials when required, and warranty.

Pavement symbol markings will be measured in units of each per location for the symbol and type material specified and will be paid for at the Contract unit price per each. This price shall include surface preparation, premarking, furnishing, installing, quality control tests, daily log, guarding devices, primer or adhesive, glass beads, reflective optics materials when required, and warranty.

Section 704.04 – Measurement and Payment is amended to replace the Pay Item Table with the following:

Pay Item	Pay Unit
(Type or class) Pavement line marking (width)	Linear Foot
(Type or Class) Contrast Pavement Line Marking (width)	Linear Foot
Pavement message marking (Message)	Each or Linear Foot
Pavement symbol marking (Symbol, Type or class material)	Each
(Type) Pavement marker (type pavement)	Each