State of Connecticut

Department of Transportation

SUPPLEMENTAL SPECIFICATIONS

TO

STANDARD SPECIFICATIONS

FOR

ROADS, BRIDGES, FACILITIES AND

INCIDENTAL CONSTRUCTION

FORM 818

2020

JULY 2020

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Section or Article	Please make the following Corrections:	Rev. Date
Division I GENERAL REQUIREMENTS AND COVENANTS		
1.01.02	1. *after the abbreviation for* ADSC *add* "AFBMS—Anti-Friction Bearing Manufacturer's Association" 2. *after the abbreviation for* AGC *add* "AGMA—American Gear Manufacturer's Association" 3. *after the abbreviation for* AMRL *add "*AMS—Aerospace Material Specification" 4. *after the abbreviation for* AWWA *add* "BGFMA—Bridge Grid Flooring Manufacturer's Association"	July20
1.01.03	1. *after the abbreviation for* pfmd. *add "*PQR—procedure qualification record*"* 2. *after the abbreviation for* surf. *add "*TBD—to be determined*"* 3. *after the abbreviation for* W *add "*WPS—weld procedure specification*"*	July20
1.05.12	*in the first sentence of the paragraph that begins* "Each such payroll shall include..." *replace* "... and, if applicable, …" *with* "... or …"	July20
1.09.02	1. *change the first sentence to* "These Value Engineering Change Proposal (VECP) provisions apply as encouragement to the Contractor to initiate, develop, and present to the Department for consideration cost-reduction proposals conceived by the Contractor, involving changes to the drawings, designs, specifications or other requirements of the Contract." 2. *under the Subarticle* "**Payment for accepted VECPs**," *delete* "5. The cost savings from a VECP that is exclusively time reduction shall be calculated as the number of Contract days reduced multiplied by the amount of liquidated damages for 1 day under the Contract." *(VECPs based on time savings only will not be accepted)*	July20
Division I GENERAL REQUIREMENTS AND COVENANTS, GENERAL CLAUSES FOR FACILITIES CONSTRUCTION		
1.20-1.01.02	1. *after the abbreviation for* ADSC *add* "AFBMS—Anti-Friction Bearing Manufacturer's Association" 2. *after the abbreviation for* AGC *add* "AGMA—American Gear Manufacturer's Association" 3. *after the abbreviation for* AMRL *add "*AMS—Aerospace Material Specification" 4. *after the abbreviation for* AWWA *add* "BGFMA—Bridge Grid Flooring Manufacturer's Association"	July20
1.20-1.01.03	1. *after the abbreviation for* pfmd. *add "*PQR—procedure qualification record*"* 2. *after the abbreviation for* surf. *add "*TBD—to be determined*"* 3. 3. *after the abbreviation for* W *add "*WPS—weld procedure specification*"*	July20
1.20-1.05.12	*in the first sentence of the paragraph that begins* "Each such payroll shall include..." *replace* "... and, if applicable, …" *with* "... or …"	July20
1.09.02	1. *change the first sentence to* "These Value Engineering Change Proposal (VECP) provisions apply as encouragement to the Contractor to initiate, develop, and present to the Department for consideration cost-reduction proposals conceived by the Contractor, involving changes to the drawings, designs, specifications or other requirements of the Contract." 2. *under the Subarticle* "**Payment for accepted VECPs**," *delete* "5. The cost savings from a VECP that is exclusively time reduction shall be calculated as the number of Contract days reduced multiplied by the amount of liquidated damages for 1 day under the Contract." *(VECPs based on time savings only will not be accepted)*	July20

Division II CONSTRUCTION DETAILS		
2.02.03	*in the third paragraph of subarticle* **5. Placement of Embankment Material** *replace* "... slopes steeper than 1:3 ..." *with* "... slopes 1 vertical to 3 horizontal or steeper ..."	July20
2.06.01	*change the first sentence of the only paragraph as follows "...*necessary for the construction of drainage ditches and paved leak-offs..."	July20
2.06.04	*change subarticle* **2. Paved Leak-offs and Paved Ditches** *to "***2. Paved Leak-offs"**	July20
6.01.03	1. *in the eighth paragraph of subarticle* 6.01.03-II-1(g) **Stay-In-Place Metal Forms for Bridge Decks**, *replace "*FS No. TT-P-641d, Type II" *with* "MIL-DTL-24441" 2. *in the eleventh paragraph of subarticle* 6.01.03-II-1(g) **Stay-In-Place Metal Forms for Bridge Decks**, *replace* "the Welding subarticle in 6.03" *with* "1.05.17, Welding." 3. *in the fourth sentence of subarticle* 6.01.03-II-10(b) **Rubbed Finish**, *replace* "stripping" *with* "striping"	July20
8.13.04	*change the only sentence as follows* "… will be measured for payment along the top arris line of the curb ..."	July20
9.21.03	*in the last sentence of* **6. Curing** *change* "6.01.03-9" *to* "6.01.03-II-9"	July20
9.70.03	*in the first sentence of paragraph 5, insert* "the" *before* "MUTCD"	July20
9.76.03	*change the last paragraph to* "… in accordance with the ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features," shall be …"	July20
11.30.02	*in the first paragraph, insert* "the" *before* "MUTCD"	July20
11.30.03	*change the second paragraph to* "… in accordance with the ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features."	July20
11.31.02	*in the first paragraph, insert* "the" *before* "MUTCD"	July20
12.12.05	*change the second to last paragraph to* "… in accordance with the ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features," shall be …"	July20
12.20.03	*change the second to last paragraph to* "… in accordance with the ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features," shall be …"	July20
Division III MATERIALS SECTION		
M.03.03	*in* **1. General Requirements:** (b), *replace* "6.01.03-3(a)" *with* "6.01.03-II-3(a)"	July20
M.03.08	*In subarticle 2.iii under* **5. (b) Joint Sealer for Structures**, *delete* "48686-0944"	July20
LIST OF STANDARD PAY ITEMS, ENGLISH/METRIC CONVERSION CHARTS, INDEX		
N/A	1. *delete* "4.09, Micro-Milling of Bituminous Concrete (0" to 3"), s.y." 2. *change* "4.09, Standard Milling of Bituminous Concrete (Greater Than 4" up to 8"), s.y." *to* "4.09, Coarse Milling of Bituminous Concrete (Greater Than 4" Up To 8"), s.y." 3. *change* "4.09, Standard Milling of Bituminous Concrete (Greater Than 8"), s.y." *to* "4.09, Coarse Milling of Bituminous Concrete (Greater Than 8"), s.y." 4. *delete* "8.03, Paved Ditch, s.y." 5. *delete* "8.03, Paved Channel, s.y." 6. *delete* "8.18, Protective Compound for Bridges, s.y."	July20

SECTION 4.09
MILLING,
REMOVAL OF EXISTING WEARING SURFACE

Replace Section 4.09 in its entirety with the following:

SECTION 4.09
MILLING,
REMOVAL OF EXISTING WEARING SURFACE

4.09.01—Description: This work shall consist of the milling, removal, and disposal of existing bituminous concrete pavement. It shall also include the complete removal and disposal of the existing bituminous concrete wearing surface, membrane waterproofing and bond breaker covering the reinforced concrete bridge deck(s) as shown on the plans or as ordered by the Engineer. The types of milling shall include the following:

1. Coarse Milling shall be used for the removal of bituminous concrete in excess of 4 inch depth.
2. Fine Milling shall be used to remove bituminous concrete from 0 to 4 inches. It may also be used to remove bituminous concrete greater than 4 inches in limited areas or where required.
3. Removal of Existing Wearing Surface shall be used where shown on the plans.

4.09.03—Construction Methods:

A. Milling:

1. General: The Contractor shall remove the bituminous concrete material using the milling type specified on the Plans. The pavement surface shall be removed to the line, grade, and existing or typical cross-section shown on the plans or as directed by the Engineer.

The bituminous concrete material shall be disposed of offsite by the Contractor at an approved disposal facility unless otherwise stated in the Contract.

Any milled surface, or portion thereof, that is exposed to traffic shall be paved within 14 calendar days unless otherwise stated in the Contract.

2. Equipment: The equipment for milling the pavement surface shall be designed and built for milling bituminous concrete pavements. It shall be self-propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement.

The milling machine shall be equipped with a built-in automatic grade averaging control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, mobile reference beam (20 feet minimum), or mobile string line (30 feet minimum). The transverse controls shall have an automatic system for controlling cross-slope at a given rate. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a lesser equipped milling machine may be permitted when approved by the Engineer.

The rotary drum of the milling machine shall have carbide or diamond-tipped teeth with the following maximum spacing and minimum milling depth:

Milling Type	Maximum Tooth Spacing*	Minimum Depth Capability (single pass)
Coarse Milling	15 mm	4 inches
Fine Milling	8 mm	4 inches

* Industry standard units

The forward speed of any milling machine shall be limited to no more than 45 feet/minute.

The teeth on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture, as outlined in 4.09.03-C, Surface Tolerance.

3. Protection: Protection shall be provided around visible existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm drainage system, the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that falls into inlet openings or inlet grates shall be removed at the Contractor's expense.

B. Removal of Existing Wearing Surface: The bituminous concrete wearing surface, membrane waterproofing and bond breaker shall be removed from the structure(s) using means acceptable to the Engineer to completely expose the concrete bridge deck(s).

Prior to removal of bituminous concrete wearing surface, the Contractor shall field verify the depth of the existing bituminous concrete by obtaining depth measurements (maximum 4 inch diameter holes) at intervals no greater than 25 feet apart in each lane. Depth verification holes shall be filled with bituminous material and compacted if the removal of wearing surface operation will not be completed within 5 days.

The existing bituminous concrete wearing surface and membrane waterproofing shall be removed in their entireties to the limits shown on the plans. The removal operations shall not begin until the Contractor is prepared to perform the permanent patching or repair to the underlying concrete within 5 working days. If this is in conflict with "Prosecution and Progress," "Maintenance and Protection of Traffic," or other Contract requirements, the more stringent specification shall apply.

Methods for removal of existing wearing surfaces shall be fine milling and shall include as many passes or amount of effort required to completely expose the concrete deck(s). Any membrane not completely removed by the milling process shall be removed by scarifying or other means as approved by the Engineer.

Alternate methods for the removal of a bituminous concrete surface may be submitted to the Engineer for review. Demonstration of the alternate removal methods may be required prior to consideration.

The existing bituminous concrete wearing surface, membrane waterproofing, bond breaker, and any other products being removed shall be disposed of offsite by the Contractor unless otherwise noted in the Contract or as directed by the Engineer.

If membrane waterproofing, as specified elsewhere in the Contract, is to be re-installed on the existing deck(s), the surface profile following removal shall be suitable for such reinstallation. The profile of the cleaned concrete surface shall meet the membrane waterproofing manufacturer's recommendations, and have no gouges greater than 1/2 inch in depth. Any deficiencies that could, in the Engineer's opinion, cause failure of, or puncture the new membrane shall be removed as part of this work.

C. Surface Tolerance:

1. General: The surface shall be free from gouges, longitudinal grooves and ridges, oil film, and other imperfections, that are a result of defective equipment, improper use of equipment, poor workmanship, or inadequate field verification. Any unsatisfactory surfaces caused by the removal operations are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer prior to opening the surface to traffic.

Any raised structures shall be delineated with traffic control devices, as directed by the Engineer.

2.Tolerances: All milling types shall provide a satisfactory riding surface with a uniform textured appearance. The Contractor shall perform random spot-checks at a minimum of 5 locations per working shift with a Contractor-supplied 10 foot straight edge to verify the surface tolerances listed below. Random spot-checks (minimum of 5 checks per shift) shall occur at a maximum of 250 feet per pass of the milling machine and shall be performed with the Engineer present. The following tolerances shall apply:

(a) **Coarse Milling:** The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed 3/8 inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed 3/8 inch.

(b) **Fine Milling:** The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed 1/4 inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed 1/4 inch.

Where a surface delamination between bituminous concrete layers or a surface delamination of bituminous concrete on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted in small increments to a maximum of +/- 1/2 inch to eliminate the condition. When removing bituminous concrete pavement entirely from an underlying Portland cement concrete pavement, all bituminous concrete pavement shall be removed leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer.

Any unsatisfactory surfaces produced by the milling operation are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

D. Transitions:

1. Construction Joints: No transverse vertical face shall be left exposed to traffic. No longitudinal vertical face greater than 1 inch shall be left exposed to traffic. Any other vertical face created by milling shall have a bituminous concrete taper constructed to the temporary transition requirements as described below.

2. Roadway Structures: Roadway structures shall not have a vertical face of greater than 1 inch exposed to traffic as a result of milling. All roadway structure edges and bituminous concrete tapers shall be clearly marked with fluorescent paint. The paint shall be maintained throughout the exposure to traffic.

All structures within the roadway that are exposed to traffic and greater than 1 inch above the milled surface shall receive a transition meeting the following requirements:

(a) For roadways with a posted speed limit of 35 mph or less:

(i) Round structures with an exposed vertical face between 1 inch and 2.5 inches shall be transitioned with a hard rubber tapered protection ring designed for that purpose of the appropriate inside diameter designed specifically to protect roadway structures. Bituminous concrete tapers at a minimum 12 to 1 (12:1) taper in all directions may be substituted for the protection rings if approved by the Engineer.

(ii) Round structures with an exposed vertical face greater than 2.5 inches shall receive a transition of bituminous concrete formed at a minimum 12 to 1 (12:1) taper in all directions.

(iii) All rectangular structures shall receive a transition of bituminous concrete formed at a minimum 12 to 1 (12:1) taper in all directions.

(b) For roadways with a posted speed limit of 40, 45 or 50 mph: All structures shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions of travel. Direction of travel shall include both the leading and trailing sides of a structure. The minimum taper shall be 12 to 1 (12:1) in all other directions.

(c) For roadways with a posted speed limit of greater than 50 mph: All structures shall receive a transition of bituminous concrete formed at a minimum 36 to 1 (36:1) taper in the direction of travel. Direction of travel shall include both the leading and trailing sides of a structure. The minimum taper shall be 12 to 1 (12:1) in all other directions.

3.Temporary Transitions: If any vertical face is formed in an area exposed to traffic, a temporary paved transition shall be established according to the requirements shown on the plans or in accordance with 4.06.03-5, "Transitions for Roadway Surface." If a milling machine is used to form a temporary transition, the length of the temporary transition shall be in accordance with 4.06.03-5, the requirements shown on the plans, or shall be as directed by the Engineer. A clean vertical face shall be established by saw cutting at all final termini limits of the Project.

4. Milling for Permanent Pavement Transitions: When called for on the plans, milling a tapered "keyway" to transition the top course of a bituminous concrete overlay to an existing

pavement shall be performed as specified elsewhere in the Contract.

E. Sweeping: Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper truck. The sweeper truck shall be equipped with a water tank and be capable of removing the millings and loose debris from the surface. The sweeper truck shall operate at a speed that allows for the maximum pickup of millings from the roadway surface. Other sweeping equipment may be provided in lieu of the sweeper where acceptable by the Engineer.

Any milled area that will not be exposed to live traffic for a minimum of 48 hours prior to paving shall require a vacuum sweeper truck in addition to, or in lieu of, mechanical sweeping. The vacuum sweeper truck shall have sufficient power and capacity to completely remove all millings from the roadway surface including any fine particles within the texture of the milled surface. Vacuum sweeper truck hose attachments shall be used to clean around pavement structures or areas that cannot be reached effectively by the main vacuum. Compressed air may be used in lieu of vacuum attachments if approved by the Engineer.

4.09.04—Method of Measurement:

Milling of bituminous concrete will be measured for payment by the number of square yards of area from which the particular type of milling has been completed and the work accepted. Deductions will not be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar structures.

The removal of wearing surface will be measured for payment by the number of square yards of bituminous concrete wearing surface removed to expose the underlying concrete deck(s). No area deductions will be made for scuppers, joints, and any similar areas.

There will be no measurement for marking roadway structures, transitions for roadway structures and sweeping of any surface that has been milled.

4.09.05—Basis of Payment: Milling work will be paid for at the Contract unit price per square yard for “Fine Milling of Bituminous Concrete (0” to 4”),” “Coarse Milling of Bituminous Concrete (Greater Than 4” Up To 8”),” and “Coarse Milling of Bituminous Concrete (Greater Than 8”).” This price shall include all equipment, tools, labor, and materials incidental thereto. No additional payments will be made for multiple passes with the milling machine(s).

Work for the removal of wearing surface will be paid for at the Contract unit price per square yard for “Removal of Existing Wearing Surface," complete and accepted, which price shall include the field verification, removal of wearing surface, removal of membrane waterproofing and bond breaker, saw cutting, and all equipment, tools and labor. No additional payments will be made for multiple passes with the milling machine(s) to remove the wearing surface.

No separate payments will be made for cleaning the pavement prior to paving; providing protection and doing handwork to remove bituminous concrete around catch basin inlets, bridge scuppers, manholes, utility valve boxes, median barriers, parapets, joints and any similar structures; repairing surface defects as a result of Contractor negligence; providing protection to underground utilities from the vibration of the milling operation; removal of any temporary milled transition; removal and disposal of millings; sweeping and all associated work.

Milling for Pavement Transitions, where identified on the plans, will be paid under a separate item specified elsewhere.

Installation of traffic control devices shall be included under the costs for “Maintenance and Protection of Traffic,” payment for the devices will be under the applicable items.

Pay Item	Pay Unit
Fine Milling of Bituminous Concrete (0” to 4”)	s.y.
Coarse Milling of Bituminous Concrete (Greater Than 4” Up To 8”)	s.y.
Coarse Milling of Bituminous Concrete (Greater Than 8”)	s.y.
Removal of Existing Wearing Surface	s.y.

SECTION 8.03
PAVED DITCHES, PAVED APRONS AND PAVED CHANNELS

Replace Section 8.03 in its entirety with the following:

SECTION 8.03
PAVED APRONS

8.03.01—Description: The work under this item includes placing and compacting of a bituminous concrete course on a pre-excavated foundation forming paved aprons in accordance with the line, grade, compacted final thickness and typical cross-section shown on the plans.

8.03.02—Materials: The materials for this work shall meet the following requirements:
Bituminous Concrete Curb Mix shall meet the requirements of 4.06 and M.04.01.
Processed Aggregate Base shall meet the requirements of M.05.01.

8.03.03—Construction Methods: The processed aggregate base course shall be placed in a single course, 4 inches compacted thickness, in accordance with 3.04.03. The surface shall be a 2 inch course of bituminous concrete curb mix. The bituminous concrete shall be placed and thoroughly compacted with compaction equipment suitable for small areas.

8.03.04—Method of Measurement: The quantity to be measured for this item will be the surface area in square yards of paved apron constructed and accepted.
Formation of Subgrade and Processed Aggregate Base will not be measured for payment.

8.03.05—Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Paved Apron." The price shall include all materials, tools, equipment and work incidental thereto.

Pay Item	Pay Unit
Paved Apron	s.y.

SECTION 8.18
PROTECTIVE COMPOUND FOR BRIDGES

Delete Section 8.18 in its entirety.

SECTION 9.24
CONCRETE DRIVEWAY RAMP

Replace Section 9.24 in its entirety with the following:

SECTION 9.24
CONCRETE DRIVEWAY RAMP

9.24.01—Description: This item shall consist of concrete driveway ramps constructed on a granular fill base in accordance with the Contract.

9.24.02—Materials: Materials for this work shall meet the following requirements:

1. **Portland Cement:** Concrete shall meet the requirements of M.03 for Class PCC03340 Concrete.
2. **Granular Fill Base:** Granular fill shall meet the requirements of M.02.01.
3. **Reinforcement:** Shall meet the requirements of M.06.01.

9.24.03—Construction Methods: Construction methods shall meet the requirements of 9.21.03. The surface shall be finished and marked off as directed by the Engineer.

The Contractor shall protect the driveway ramp from damage until it is opened to traffic. The ramp shall not be opened to traffic until the attainment of a compressive strength of 3,000 psi. Any damage occurring prior to the Department opening the driveway ramp to traffic shall be repaired or replaced at the Contractor's expense.

9.24.04—Method of Measurement: This work will be measured for payment as follows:

1. **Concrete Driveway Ramp:** This work will be measured for payment by the actual number of cubic yards of completed and accepted concrete driveway ramps.
2. **Excavation:** Excavation below the finished grade of each ramp, backfilling and disposal of surplus material will not be measured for payment; but the cost shall be included in the Contract price for Concrete Driveway Ramp.

Excavation above the finished grade of each ramp will be classified and paid for in accordance with 2.02.

3. **Granular Fill Base:** This work will not be measured for payment, but the cost shall be included in the Contract price for Concrete Driveway Ramp.
4. **Reinforcement:** This material will not be measured for payment, but the cost shall be included in the Contract price for Concrete Driveway Ramp.

9.24.05—Basis of Payment: This work will be paid for at the Contract unit price per cubic yard for "Concrete Driveway Ramp," complete in place, which price shall include all excavation as specified above, backfill, disposal of surplus materials, and all materials, equipment, tools and labor incidental thereto.

Pay Item	Pay Unit
Concrete Driveway Ramp	c.y.

SECTION 9.71
MAINTENANCE AND PROTECTION OF TRAFFIC

Replace Section 9.71 in its entirety with the following:

SECTION 9.71
MAINTENANCE AND PROTECTION OF TRAFFIC

9.71.01—Description: Unless other provisions are made on the plans or in the special provisions of the Contract, the Contractor shall keep the roadway under construction open to traffic for the full length of the Project and shall provide a sufficient number of travel lanes and pedestrian passways to move that traffic ordinarily using the roadway. The travel lanes and pedestrian passways shall be drained and kept reasonably smooth and in suitable condition at all times in order to provide minimum interference to traffic consistent with the proper prosecution of the work.

Suitable ingress and egress shall be provided at all times where required, for all intersecting roads and for all abutting properties having legal access.

When a scheme for maintenance of traffic, which may include detours, is shown on the plans or described in the special provisions of the Contract, this shall govern unless an alternate scheme acceptable to the Engineer is offered by the Contractor at no additional cost. If no scheme is shown on the plans or described in the special provisions of the Contract, and the Contractor wishes to deviate from the provisions of maintaining traffic as described in this Section, the Contractor may submit and the Engineer may approve a schedule showing a proposed sequence of operations and a compatible method of maintaining traffic.

The Contractor shall provide to the Engineer the name of the person who shall be responsible for installing and maintaining all temporary traffic control devices in work zones on limited access highways. This person shall be certified as a Traffic Control Supervisor by ATSSA. This certification shall be maintained and valid throughout the duration of the Contract.

9.71.03—Construction Methods: The Contractor shall furnish and erect signs legally closing the highway to traffic, as shown on the plans or directed by the Engineer, prior to commencing any work on the Project.

The Contractor shall furnish a sufficient number of signs, barricades, drums, traffic cones and delineators to forewarn traffic of the construction as shown on the traffic control plans contained within or as directed by the Engineer.

The Contractor shall also provide such safety measures, pavement markings, warning devices and signs as deemed necessary to safeguard and guide the traveling public through detours ordered by the Engineer, included in the approved scheme for maintenance of traffic, or as shown on the plans. The Contractor shall erect, maintain, move, adjust, clean, relocate and store these signs, barricades, drums, traffic cones and delineators when, where and as directed by the Engineer, and in accordance with the ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features."

The use of unauthorized or unapproved signs, barricades, drums, traffic cones or delineators will not be permitted.

All signs in any one signing pattern shall be mounted the same height above the traveled surface. The Contractor shall keep all signs in proper position, clean and legible at all times. Care shall be taken so that weeds, shrubbery, construction materials or equipment, and soil, are not allowed to obscure any sign, light, or barricade. Signs that do not apply to existing conditions shall be removed or adjusted so that the legend is not visible to approaching traffic.

The Contractor, when ordered by the Engineer, shall remove snow and take care of icy conditions on temporary, new and existing sidewalks on any part of the right-of-way within the limits of the Project. Payment for the cost thereof, will be made as extra work.

Snow removal and correction of icy conditions, other than those resulting from the Contractor's operations, on uncompleted contracts under traffic, will remain an obligation of the State or others.

Should the Contractor fail to perform any of the work required under this section, the State may perform or arrange for others to perform such work. In such cases, the State will deduct from money due or to become due the Contractor all expenses connected there with which are found to be greater than the cost to the State had the Contractor performed the specified work.

9.71.04—Method of Measurement: This item, being paid on a lump sum basis, will not be measured for payment.

9.71.05—Basis of Payment: This work will be paid for at the Contract lump sum price for "Maintenance and Protection of Traffic." This price shall include all costs for labor, training, equipment and services involved in the erection, maintenance, moving, adjusting, cleaning, relocating and storing of signs, barricades, drums, traffic cones and delineators furnished by the Contractor, as well as all costs of labor and equipment involved in the maintenance of traffic lanes and detours, except for pavement markings, ordered or included in the approved scheme for maintenance of traffic. This price shall also include furnishing and services of a trained Traffic Control supervisor for work on limited access highways.

"Maintenance and Protection of Traffic" does not include the cost of signs, barricades, drums, traffic cones, delineators, or the furnishing and placing of materials such as borrow, gravel, crushed stone, bituminous concrete for patching and pipe. These items will be paid for at their respective Contract unit prices, or in the absence of applicable Contract unit prices, as extra work. If the Engineer requires the Contractor to provide facilities in excess of the requirements of the adopted scheme for maintenance and protection of traffic, the Contractor shall perform the required work, and payment for the cost thereof will be made at applicable Contract unit prices, or in the absence of applicable Contract unit prices, as extra work.

Pay Item	Pay Unit
Maintenance and Protection of Traffic	l.s.

SECTION 9.77
TRAFFIC CONE

Replace Section 9.77 in its entirety with the following:

SECTION 9.77
TRAFFIC CONE

9.77.01—Description: Under this item the Contractor shall furnish all reflectorized orange traffic cones required on the Project to meet the requirements as stated in the item "Maintenance and Protection of Traffic," as shown on the plans and as directed by the Engineer.

The Contractor shall have, available on the Project, a sufficient number of traffic cones to fulfill all the requirements as specified in the Contract and to replace those traffic cones which have become damaged.

9.77.02—Materials: Traffic cones shall be constructed of materials to a thickness to withstand impact without damage to cones or to vehicles. The traffic cones shall be of sufficient mass or have bases to which ballast may be added to assure that they will not be blown over or displaced by wind from passing vehicles. Traffic cones used at night shall be reflectorized by utilizing Retroreflective Sheeting in accordance with M.18.09.

The following documentation shall be submitted by the Contractor prior to using traffic cones on the Project:

1. For traffic cones manufactured on or before December 31, 2019 and used for the duration of their normal service life, a copy of the manufacturer's self-certification that the traffic cones comply with the requirements of the AASHTO Manual for Assessing Safety Hardware (MASH) or the NCHRP Report 350 is required.
2. For traffic cones manufactured after December 31, 2019, a copy of the manufacturer's self-certification that the traffic cones comply with the requirements of the 2016 edition of the AASHTO MASH is required.

9.77.04—Method of Measurement: This item will be measured for payment by the number of traffic cones used on the Project.

9.77.05—Basis of Payment: This item will be paid for at the Contract unit price each for "Traffic Cone" used on the Project. Each cone will be paid for once, regardless of the number of times it is used on the Project.

Any traffic cones that are missing, damaged or defaced so that they are not effective, as determined by the Engineer in accordance with ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features," shall be replaced by the Contractor at no cost to the State.

When the traffic cones are no longer required on the Project they shall remain the property of the Contractor.

Pay Item	Pay Unit
Traffic Cone	ea.

SECTION 9.78
TRAFFIC DRUM

Replace Section 9.78 in its entirety with the following:

SECTION 9.78
TRAFFIC DRUM

9.78.01—Description: Under this item the Contractor shall furnish all traffic drums required on the Project to correspond to the traffic patterns, as indicated in the Contract for "Maintenance and Protection of Traffic," as shown on the plans and as directed by the Engineer.

9.78.02—Materials: Traffic Drums shall be manufactured plastic or rubber devices designed in accordance with the latest edition of the MUTCD. The design of the device will allow for the installation of barricade warning lights. The device shall be stabilized with the use of sandbags or other approved means.

Retroreflective Sheeting, in accordance with M.18.09, shall be used on traffic drums. Only one type sheeting shall be used on a drum and all drums furnished on a construction project shall be manufactured with the same type retroreflective sheeting.

The following documentation shall be submitted by the Contractor prior to using traffic drums on the Project:

1. For traffic drums manufactured on or before December 31, 2019 and used for the duration of their normal service life, a copy of the manufacturer's self-certification that the traffic drums comply with the requirements of the AASHTO MASH or the NCHRP Report 350 is required.
2. For traffic drums manufactured after December 31, 2019 and used without attachments, a copy of the manufacturer's self-certification that the traffic drums comply with the requirements of the 2016 edition of the AASHTO MASH is required.
3. For traffic drums manufactured after December 31, 2019 and used with attachments such as warning lights, a copy of the Federal-Aid Eligibility Letter issued by the FHWA to the manufacturer documenting that the traffic drums with the proposed attachments meet the crash test and evaluation criteria of the 2016 AASHTO MASH is required.

9.78.03—Construction Methods:

The Contractor shall have, available on the Project, a sufficient number of traffic drums to fulfill all the requirements, as specified in the Contract, to provide adequate traffic control during periods of unforeseen circumstances or emergencies.

Traffic drums shall be designed and installed in accordance with the plans, the MUTCD latest edition, and as directed by the Engineer.

Any traffic drum that is missing, damaged or defaced so that it is not effective, as determined by the Engineer and in accordance with ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features," shall be replaced by the Contractor.

When the traffic drums are no longer required on the Project, they shall remain the property of the Contractor.

9.78.04—Method of Measurement: This work will be measured for payment by the number of traffic drums used on the Project.

9.78.05—Basis of Payment: This item will be paid for at the Contract unit price each for "Traffic Drum" used on the Project. Each drum will be paid for once, regardless of the number of times it is used on the Project.

Pay Item	Pay Unit
Traffic Drum	ea.

SECTION 9.79
CONSTRUCTION BARRICADE

Replace Section 9.79 in its entirety with the following:

SECTION 9.79
CONSTRUCTION BARRICADE

9.79.01—Description: Under this item the Contractor shall furnish all construction barricades of the specified type required on the Project to comply with the requirements of NCHRP Report 350 (TL-3), or the AASHTO MASH, and the requirements stated in the item "Maintenance and Protection of Traffic," as shown on the plans and as directed by the Engineer.

9.79.02—Materials: Construction barricades shall consist of the following materials:

The frame shall be of polyvinyl chloride pipe meeting the requirements of ASTM D2241 for PVC 1120 or 1220, SDR 21 (pressure rating 200 psi), ASTM D3034, SDR 35 or an approved equal. All straight members shall be the color white.

Wyes, tees and elbows for joint connections shall be polyvinyl chloride of suitable size and strength for the purpose intended.

Joints shall not be glued and a 3/16 inch nylon rope (or equivalent) shall be threaded loosely through the pipe to keep sections from flying if hit by a vehicle.

Face panels used as horizontal members shall be constructed of a suitable plastic material, 0.060 inch high-impact styrene, anodized aluminum of no less than 0.025 inch thickness or a comparable substitute approved by the Engineer.

All hardware shall be in accordance with standard commercial specifications and shall be approved by the Engineer.

Alternate stripes of white and fluorescent orange retroreflective sheeting shall be applied to the horizontal members as shown on the plans. Only one type sheeting shall be used on a barricade and all barricades on a construction project shall be constructed with the same type of retroreflective sheeting. Retroreflective sheeting shall meet the requirements of M.18.09.

Construction barricades shall be designed and fabricated so as to prevent them from being blown over or displaced by wind. Construction barricades shall be approved by the Engineer before they are placed into service.

Materials Certificates shall be required confirming compliance with the requirements set forth in the plans and specifications for these barricades.

The following documentation shall be submitted by the Contractor prior to using barricades on the Project:

1. For barricades manufactured on or before December 31, 2019 and used for the duration of their normal service life, a copy of the Federal-Aid Eligibility Letter issued by the FHWA to the manufacturer documenting that the barricades meet the crash test and evaluation criteria of the AASHTO MASH or of the NCHRP Report 350 is required.
2. For barricades manufactured after December 31, 2019, a copy of the Federal-Aid Eligibility Letter issued by the FHWA to the manufacturer documenting that the barricades meet the crash test and evaluation criteria of the 2016 AASHTO MASH is required.

9.79.03—Construction Methods: The Contractor shall furnish a sufficient number of construction barricades required for the traffic patterns for all operations which are being undertaken concurrently. The barricades shall be constructed in a neat and workmanlike manner to the satisfaction of the Engineer.

Ineffective barricades, as determined by the Engineer and in accordance with ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features," shall be replaced by the Contractor at no cost to the State.

Barricades that are no longer required shall be removed from the Project and shall remain the property of the Contractor.

9.79.04—Method of Measurement: This work will be measured for payment by the number of construction barricades used on the Project.

9.79.05—Basis of Payment: This item will be paid for at the Contract unit price each for "Construction Barricade" of the type specified and used on the Project. Each barricade will be paid for once, regardless of

the number of times it is used on the Project.

Pay Item	Pay Unit
Construction Barricade (Type)	ea.

SECTION 9.81
42 INCH TRAFFIC CONE

Replace Section 9.81 in its entirety with the following:

SECTION 9.81
42 INCH TRAFFIC CONE

9.81.01—Description: This item shall consist of furnishing 42-inch retroreflective traffic cones required on the Project to meet the requirements of the traffic control plans, as stated in the item "Maintenance and Protection of Traffic," as shown on the plans or as directed by the Engineer.

The Contractor shall have available on the Project a sufficient number of traffic cones to fulfill all the requirements as specified in the Contract and to replace those which have become damaged.

9.81.02—Materials: The traffic cone shall be manufactured of 2 piece construction - cone and stabilizer base. The cone shall be constructed of impact-resistant orange plastic or rubber of a thickness able to withstand impact without damage to cones or vehicles. The bottom of the cone shall be 8 1/2 inch conical diameter tapering to the top of the cone which shall be 3 1/2 inch conical diameter. The design of the device will allow for the installation of a weighted stabilizer base. The stabilizer base shall not be round in shape. It shall have a hole in the middle to allow for quick placement over the cone. The base shall be constructed of impact-resistant black plastic or rubber ballasted to 18 lbs.

Retroreflective stripes shall be fabricated from retroreflective sheeting. All stripes shall be of one type of sheeting. Retroreflective sheeting shall be as specified in M.18.09.

The following documentation shall be submitted by the Contractor prior to using traffic cones on the Project:

1. For traffic cones manufactured on or before December 31, 2019 and used for the duration of their normal service life, a copy of the manufacturer's self-certification that the traffic cones comply with the requirements of AASHTO MASH or NCHRP Report 350 is required.
2. For traffic cones manufactured after December 31, 2019, a copy of the manufacturer's self-certification that the traffic cones comply with the requirements of the 2016 edition of the AASHTO MASH is required.

9.81.03—Construction Methods: The stabilizer base shall be attached to the traffic cone in accordance with the manufacturer's instructions. The Contractor shall ensure that the devices are kept clean and bright.

9.81.04—Method of Measurement: This item will be measured for payment by the number of traffic cones used on the Project.

9.81.05—Basis of Payment: This item will be paid for at the Contract unit price for "42 Inch Traffic Cone" used on the Project. Each cone will be paid for once, regardless of the number of times it is used on the Project.

Any traffic cones that are missing, damaged or defaced so that they are not effective, as determined by the Engineer, and in accordance with ATSSA "Quality Guidelines for Temporary Traffic Control Devices and Features," shall be replaced by the Contractor at no cost to the State.

When the traffic cones are no longer required on the Project, they shall remain the property of the Contractor.

Pay Item	Pay Unit
42 Inch Traffic Cone	ea.

SECTION M.07
PAINT

M.07.01—General for All Paints and Enamels
M.07.02—Coating Systems for Structural Steel
M.07.03 through M.07.19 —Vacant
M.07.20—Waterborne Pavement Marking Paint
M.07.21—Hot-Applied Waterborne Pavement Marking Paint
M.07.22—Epoxy Resin Pavement Markings
M.07.23—Vacant
M.07.24—Preformed Black Line Mask Pavement Marking Tape
M.07.25—Vacant
M.07.30—Glass Beads

M.07.01—General for All Paints and Enamels:

1. **Paints and enamels** shall consist of pigments of the required fineness and composition, ground in the required vehicle by a suitable grinding machine to the required fineness. All pigments, resins, oils, thinners and driers shall be free from adulterants.
2. **Proportions:** All proportions in formulas are by weight unless otherwise specified.
3. **Fineness:** All pigments, except aluminum, unless otherwise specified, shall be finely ground with 100% passing the No. 200 sieve; with no less than 97% passing the No. 325 sieve.
4. **Curdling, Livering, Leveling:** The paint or enamel shall not liver or curdle. The pigment shall remain in suspension in a satisfactory manner through the expected shelf life specified on the label. The enamel type paints shall level properly and not show brush marks.
5. **Colors:** All paints and enamels shall be matched to the Department's standard shades.
6. **Time of Drying:** All paints or enamels, unless otherwise specified, shall dry to full gloss in not more than 18 hours.
7. **Weight per Gallon:** The weight per gallon of all paints and enamels shall be determined at 77°F.
8. **Shipping:** All paints and enamels shall be shipped in containers plainly marked with the name, net weight and volume of paint or enamel content. The manufacturer's name, address, date and lot number shall be marked on every package.
9. **Samples, Sampling, and Testing:** The manufacturer shall supply a Certified Test Report per lot for any pigment, oil, resin, thinner, drier or paint. When a portion of the lot is delivered, a Material Certificate is required. Upon request by the Engineer, the manufacturer shall submit a sample in accordance with the latest edition of the Materials Testing Manual's "Minimum Schedule for Acceptance Testing."

Sampling and testing shall be performed in accordance with ASTM, Federal Standards, or by methods established by the Department.

M.07.02—Coating Systems for Structural Steel: The coating system used shall be specified in the Contract and shall be selected from the Northeast Protective Coating Committee's (NEPCOAT's) Specification Criteria for Protective Coatings qualified products list.

Color: The color of the topcoat material shall be as noted on the plans (AMS-STD-595 Color Number).

Packaging and Labeling of Coating Material: The container shall be designed to store the specific coating material. Each container of coating material shall bear a label that identifies the name of the coating manufacturer, the name of the product, the lot and batch numbers, the date of manufacture and the shelf life expiration date. The label shall also include complete specific instructions for opening the container and for mixing, thinning, and applying the coating material contained therein. If the coating material cannot be positively identified from the label on the container, it shall not be used.

Delivery: Coating material shall be furnished in the manufacturer's original sealed and undamaged container.

Control of Materials: For each coating material, a Materials Certificate shall be submitted in conformance with 1.06.07. The Material Certificate shall indicate compliance with NEPCOAT Acceptance Criteria for Protective Coatings, List A or B.

M.07.03 through M.07.19—Vacant

M.07.20—Waterborne Pavement-Marking Paint: Pavement-marking paint shall be waterborne paint and shall be white or yellow, depending on its use, for application on bituminous concrete and Portland cement concrete pavement. This paint shall be compatible with the stripe-painting equipment to be used on

the Project. All requirements shall be as specified in M.07.21, except as follows:

1. Total nonvolatile compounds shall not be less than 70% by weight.
2. Pigment shall be 50 to 60% by weight.
3. Drying time for no-pick-up shall be 15 minutes or less when tested in accordance with ASTM D711.
4. The Contractor shall provide a Materials Certificate in accordance with 1.06.07 for each portion of a batch or lot delivered to the Project site.

M.07.21—Hot-Applied Waterborne Pavement-Marking Paint: Fast-drying waterborne pavement-marking paint to be applied on bituminous concrete and Portland cement concrete pavements shall be the color specified on the plans. This paint shall be capable of being applied with stripe-painting equipment at an application temperature of 130 to 145°F and shall have good spraying characteristics. The Contractor shall provide a Materials Certificate in accordance with 1.06.07 for each portion of a batch or lot delivered to the Project site.

General: Specifications and publications that apply are as follows:

- FS TT-P-1952 - Paint, Traffic and Air Field Marking, Waterborne
- Federal Test Method Standard (FTMS) No.141 - Paint, Varnish, Lacquer and Related Materials, Methods of Inspection, Sampling and Testing
- The MUTCD

ASTM Standards:

- D211 - Specifications for Chrome Yellow and Chrome Orange Pigments
- D476 - Classification for Dry Pigmentary for Titanium Dioxide Pigments

Detailed Requirements, Formulation and Manufacture: The paint shall be formulated and manufactured from first-grade raw materials and shall be free from defects and imperfections. The materials shall not exhibit settling or jellying after storage in the sealed containers upon receipt. The paint shall provide the proper anchorage, refraction and reflection for the finished glass spheres when applied as specified.

Composition: The composition of the paint material shall meet the requirements of any applicable Federal, State or Local regulation for products of this type and shall meet the following requirements:

1. Paint shall not contain more than 0.06% lead when tested in accordance with ASTM D3335
2. Total nonvolatile organic compounds shall be a minimum of 76% by weight
3. Pigment shall be 58 to 63% by weight when tested in accordance with ASTM D3723
4. Resin solids shall be composed of 100% acrylic emulsion polymer
5. Volatile organic compounds shall not exceed 1.25 lb./gal. excluding water when tested in accordance with ASTM D2369
6. Flash Point: Closed-cup flash point shall not be less than 145°F
7. Density: Weight per gallon shall not be less than 12.5 lb./gal. when tested in accordance with ASTM D1475

Viscosity: The consistency of the paint shall not be less than 80, nor more than 90 Krebs units when tested in accordance with ASTM D562.

Flexibility: The paint shall not show cracking or flaking when tested in accordance with ASTM D522. The panels shall be lightly buffed with steel wool and thoroughly cleaned with solvent before being used for tests.

Dry Opacity: Both white and yellow paints shall have a minimum contrast ratio of 0.96 when tested in accordance with ASTM D2805. Contrast ratio shall be determined by applying a wet film thickness of 0.005 inch to a standard hiding-power chart. After drying, the black- and- white-reflectance values shall be determined using a suitable reflectometer and the contrast ratio determined.

Bleeding: The paints shall have a minimum bleeding ratio of 0.97 when tested in accordance with FS TT-P-1952.

Abrasion Resistance: No less than 210 liters of sand shall be required to remove paint film when tested in accordance with FS TT-P-1952.

Color: The paint shall not discolor in sunlight and shall maintain colorfastness throughout its life. Color determination shall be made without beads, after a minimum of 24 hours. Paint color shall be in accordance with the MUTCD.

Glass Bead Adhesion: The paint with glass beads conforming to M.07.30, applied at the rate of 6.0 lb./gal. of paint, shall require not less than 150 liters of sand to remove paint film and glass beads.

Scrub Resistance: The paint shall pass 300 cycles minimum when tested in accordance with ASTM D2486.

Drying Time: Drying time to no pick-up shall be 3 minutes or less when tested in accordance with ASTM D711.

M.07.22—Epoxy Resin Pavement Markings:

General Requirements:

Identification: Each container must be labeled with the following information: Name and address of manufacturer, production batch number, date of manufacture, grade name and/or identification number, type of material, number of gallons, Contract number, directions for mixing and application.

Certification*:* The Contractor shall provide a Material Certificate in accordance with 1.06.07 for each portion of a batch or lot delivered to the Site.

Detailed Requirements:

(a) Epoxy Resin Material: The material shall be composed of epoxy resins and pigments only. The white and the yellow epoxy resin materials shall be composed of approved materials and be lead- and chromium-free.

(b) Composition:

WHITE (percent by weight)	YELLOW (percent by weight)
20% ± 2% Titanium Dioxide (ASTM D476 Type III)	
80% ± 2% Epoxy Resins	75% ± 2% Epoxy Resins

(c) Color: The white material shall be in accordance with the MUTCD, when the material is placed in a type EH weatherometer for a period of 500 hours and weathered according to ASTM G152. The yellow material shall be in accordance with the MUTCD.

(d) Adhesion Capabilities: When the adhesion of the material to Portland cement concrete is tested in accordance with AASHTO T 237, the failure of the system must take place in the concrete.

(e) Abrasion Resistance: When the abrasion resistance of the material is tested according to ASTM D4060 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82.

(f) Hardness: The Type D durometer hardness of the material shall be not less than 75 nor more than 90 when tested in accordance with ASTM D2240 after the material has cured for 72 hours at 73°F ± 3.5°F.

(g) Tensile Strength: The tensile strength of the material, when tested in accordance with ASTM D638, shall not be less than 6,000 psi after 72 hours cure at 73°F ± 3.5°F.

(h) Compressive Strength: The compressive strength of the material, when tested in accordance with ASTM D695, shall not be less than 12,000 psi after 72 hours cure at 73°F ± 3.5°F.

(i) Shelf Life: The individual components shall not require mixing prior to use when stored for a period of 12 months.

(j) Glass Beads: The glass beads shall meet the requirements of M.07.30.

M.07.23—Vacant

M.07.24—Preformed Black-Line Mask Pavement-Marking Tape:

General Requirements*:* The preformed, patterned black-line mask pavement-marking tape shall consist of a matte black, non-reflective tape in widths or sizes sufficiently large to mask the existing markings which are to be temporarily covered.

The patterned masking tape shall be pre-coated with a pressure sensitive adhesive and shall be capable of being adhered to existing markings, on bituminous concrete pavement or Portland cement concrete in accordance with the manufacturer's instructions without the use of heat, solvents or other additional adhesives, and shall be immediately ready for traffic use after application. The Contractor shall identify equipment necessary for proper application and removal, and make recommendations for application that will assure effective product performance.

The preformed, patterned black-line masking pavement-marking tape shall be suitable for use for 1 year after the date of receipt when stored in accordance with the manufacturer's recommendations.

Detailed Requirements:

(a) Composition: The non-reflective, patterned black-line mask pavement-marking tape shall not contain metallic foil and shall consist of a mixture of high quality polymeric materials, pigments and

inorganic fillers distributed throughout its base cross-sectional area, with a matte black non-reflective top layer. The patterned surface shall have a minimum of 20% of the surface area raised and coated with non-skid particles. The channels between the raised areas shall be substantially free of particles. The film shall be pre-coated with a pressure sensitive adhesive. A non-metallic medium shall be incorporated to facilitate removal.

(b) Skid Resistance: The surface of the patterned, non-reflective black-line mask pavement-marking tape shall provide an initial average skid resistance value of 60 British Pendulum Number when tested in accordance with ASTM E303.

(c) Thickness: The patterned material, without adhesive, shall have a minimum thickness of 0.065 inch at the thickest portion of the patterned cross-section and a minimum thickness of 0.02 inch at the thinnest portion of the cross-section.

(d) Adhesion: The black-line mask pavement-marking tape shall adhere to the pavement and existing pavement markings under climatic and traffic conditions normally encountered in the construction work zone.

(e) Removability: The black-line mask pavement-marking tape shall be capable of being removed after its intended use without the use of heat, solvents, grinding, sand or water blasting.

M.07.25—Vacant

M.07.30—Glass Beads: The glass beads shall meet the requirements of AASHTO M 247, Type 1 or 4, depending on application.

SECTION M.16
TRAFFIC CONTROL SIGNALS

Replace Subarticle M.16.06-9 in its entirety as follows:

M.16.06—Traffic Signals:

9. Painting: All surfaces of the signal housing, housing door, visors, inside and out, the back surface of the backplate and all brackets and hardware shall be cleaned and coated with a Primer conforming to FS TT-P-1757. The surfaces shall then be finished with 3 coats of infrared oven baked paint applied by the manufacturer, before assembly.

First Coat: The primer shall be iron oxide baking primer and shall meet or exceed the requirements of FS TT-P-664.

Second Coat: Shall be light gray exterior baking enamel and shall comply with FS TT-E-489, either No. 16251, No. 16314, or No. 16376 Gray.

Third Coat: Shall be exterior baked enamel and shall comply with FS A-A-2962.

The housing, housing door, the back surface of the backplate, and all brackets and hardware shall be painted black by the manufacturer. The color shall be Aerospace Material Specification – Standard 595 (AMS-STD-595) Color No. 17038.

At intersections at Merritt Parkway interchanges, the housing, housing door, the back surface of the backplate, and all brackets and hardware shall be painted black by the manufacturer. The color shall be AMS-STD-595 Color No. 14056.

The outside of the visors shall have a dull black finish that meets FS TT-E-527.

The inside of the visors and front surface of the backplate per the MUTCD shall have a dull black finish to minimize light reflection and to increase contrast between the signal indication and its background. The dull black finish shall meet FS TT-E-527.

Replace Subarticle M.16.07-C-2 in its entirety with the following:

M.16.07—Pedestrian Signal:

2. LED: The optical unit shall consist of multiple LED light sources and a regulated power supply assembled as a sealed unit. The diodes shall be arranged to display a full-hand symbol side by side with a full pedestrian symbol. The optical unit shall fit into a standard pedestrian signal housing so that it may be installed into an existing incandescent pedestrian signal. The LED optical unit shall be capable of maintaining message symbol integrity despite any partial loss of LEDs. The beam color shall match that of the incandescent message: walking symbol - lunar white, hand - Portland orange. The beam pattern and intensity shall meet ITE specifications. The intensity may not degrade by more than 10% per annum. The optical unit shall be warranted by the manufacturer for a period of 5 years.

Electrical Requirements:

- Input Voltage: 89 VAC to 135 VAC
- Wattage: 15 Watts
- Input Impedance at 60 Hz must satisfy all conflict monitor requirements.
- A regulated power supply shall be engineered to protect the LEDs from electrical surges and transient voltages.

Replace Subarticles M.16.07-E and M.16.07-F with the following:

E. Hardware: All exposed screws and fasteners shall be stainless steel. All internal screws, fasteners and metal parts shall be stainless steel, non-corrosible materials; or cadmium-plated ferrous materials.

F. Painting: All surfaces of the signal housing, door, all brackets and hardware, and visors, inside and out, shall be finished with 3 coats of infrared-oven- baked paint applied by the manufacturer before assembly. All brackets and hardware shall be painted black by the manufacturer. The color shall be AMS-STD-595 Color No. 17038.

First Coat: The primer shall be iron oxide baking primer and shall meet or exceed the requirements of FS TT-P-645.

Second Coat: Shall be light gray exterior baking enamel and shall meet the requirements of FS TT-E-489, No. 16251, No. 16314 or No. 16376 gray.

Third Coat: Shall be exterior-baking enamel and shall meet the requirements of FS A-A-2962.

The housing, housing door, outside of the visor, and all brackets and hardware shall be painted black by the manufacturer. The color shall be AMS-STD-595 Color No. 17038.

At intersections at Merritt Parkway interchanges, the housing, housing door, outside of visor, and all brackets and hardware shall be painted dark green by the manufacturer. The color shall be AMS-STD-595 Color No. 14056.

The inside of the visor shall have a dull black finish to minimize light reflection and to increase contrast between the signal indication and its background. The dull black finish shall meet FS TT-E-527.

In Article M.16.08, replace the "Painting" subarticle with the following:

M.16.08—Pedestrian Push Button:

Painting: All surfaces of the unit shall be finished with 3 coats of infrared oven-baked paint applied by the manufacturer, before assembly.

First Coat: Primer, shall be iron oxide baking primer and shall meet or exceed performance specification of FS TT-P-664.

Second Coat: Gray Enamel, shall be lusterless and shall comply with FS TT-E-527.

Third Coat: Black Enamel, shall be BLACK exterior-baking enamel and shall meet the requirements of FS A-A 2962. The color shall be AMS-STD-595 Color No. 17038. At intersections at Merritt Parkway interchanges, the color shall be AMS-STD-595 Color No. 14062.

In Article M.16.09, replace the "Painting" subarticle with the following:

M.16.09—Controllers:

Painting: All outside surfaces of the cabinet and door shall be finished with 3 coats of infrared oven-baked paint before assembly.

First Coat: The primer shall be iron oxide baking primer and shall meet or exceed FS TT-P-636.

Second and Third Coats: The second and third coats will be aluminum paint meeting the requirements of FS TT-P-320, and Federal Test Method Standard 141. The color shall be AMS-STD-595 Color No. 17178.

Replace the last paragraph in Article M.16.17 with the following:

M.16.17—Illuminated Signs:

A weatherproof housing of the dimensions specified on the plans shall be provided to enclose the fiber optic module assembly with bifurcated output fiber bundles, color filters, light sources and transformers. The sign housing frame shall be manufactured from extruded aluminum, 6061-T6, ASTM B221. This assembly shall be provided with a hinged access door. The hinge shall be stainless steel piano type hinge mounted on the left side of the door. All external hardware shall be stainless steel, internal hardware shall be corrosion resistant. The housing shall have a minimum of four 1 inch diameter drainage holes. The entire front face of the sign shall be protected by a 1/8 inch thick sheet of clear polycarbonate mounted in the door frame. The housing shall be Federal Black according to AMS-STD-595 Color No. 17038 and the aluminum front panel shall be flat black according to AMS-STD-595 Color No. 37031 unless otherwise specified on the plans. At intersections at Merritt Parkway interchanges, the housing shall be AMS-STD-595 Color No. 14062. The complete sign assembly shall not weigh more than 150 pounds.

The legend displayed for an "Overhead Illuminated 'Stop Ahead' Sign" shall consist of letters 12 inches high and approximately 9 inches wide formed by fiber optic bundles spaced approximately 1 1/2 inches apart. The sign shall be supplied completely assembled and ready to be checked out.