

(b) The radius of bends shall be such that no cracking of the plate occurs. Measure the radii at the concave surface as follows:

MATERIAL		Radius in terms of plate thickness (inches)*		
ASTM Specification	Grade	T<1	1<t<2	2<t
ASTM A709	Gr. 36	1.5t	1.5t	2.0t
ASTM A709	Gr. 50, Gr.50W	1.5t	2.0t	2.5t
ASTM A709	Gr. 70W	1.5t	2.5t	3.0t

* A radius of 5t is required if the plate is subject to calculated stresses

(c) If a smaller radius is required, heat the bend line to a temperature between 1000° F and 1150° F before bending. Heat plates greater than 2 inches in thickness to a temperature of between 900° F and 1150° F before bending. Do not heat HPS70W without written approval of the Fabrication Engineer.

504.23 Die Stamping Die stamp primary members (including splice material, diaphragms and cross frames on curved bridges) in no-stress locations. No-stress locations include the ends of girders within the cross-sectional area, web splice plates in the middle third of the plate height and outside the outermost row of bolt holes and flange splice plate ends between the outermost row of holes and the edge. Use blunt-nose, low-stress dies.

504.24 Camber and Curvature When camber or curvature is required for stringers or girders, it will be specified on the Plans. Measure and record specified camber or curvature using the same ordinates shown on the reviewed shop drawings Plans after all welding is complete. When no camber or curvature is specified, variations in straightness of rolled shapes, with and without cover plates, shall not exceed the tolerances of AASHTO M-160 (ASTM A 6).

504.25 Heat Cambering and Curving Minor correction of camber or sweep of welded plate girders is considered part of ordinary shop fabrication practice and does not require an approved procedure, however, use the following guidelines:

1. Notify the QAI prior to beginning heat correction
2. Do not use hammers
3. Have suitable temperature indicating crayons at the work station
4. Do not exceed 1150° F
5. Cool in still air to 600 ° F. Below 600 ° F compressed air may be used

All cambering and curving operations that are not corrective shall meet the following:

Use a camber/curving procedure reviewed by the Fabrication Engineer. The procedure shall include:

1. The heating pattern and sequencing of heating

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2. Method of support of the member
3. Proposed minimum and maximum base metal temperature
4. Method of heating (fuel, nozzle size, etc.)

Clean structural steel to SSPC SP-6 prior to heating. Heat both the flanges and the web using two torches (one torch on either side of the plate). Do not use restraint or jacking devices unless approved by the Fabrication Engineer. Submit calculations showing that the nominal bending stress in the member does not exceed $0.60 F_y$ if restraint or jacking is proposed.

The target temperature for all ASTM A709 steel is 1100° F. Steel heated in excess of 1200° F will be subject to rejection. Measure the temperature of the steel with temperature indicating crayons applied to the heated area 10-15 seconds after the torch is removed or with a pyrometer that has been calibrated within the past year. Provide temperature-indicating crayons in increments of 50 ° F between 1050° F and 1250° F to each torch operator. Stop the cambering/curving operation if a torch operator fails to demonstrate the proper skill and technique necessary to prevent potential damage to the steel.

Camber stringers and girders using a "V" pattern with a 10-15 degree included angle that extends the full web depth, less 2 inches at the apex. Heat the web first beginning at the apex of the triangle and proceeding toward the base. Begin heating the flange immediately after completion of the web.

The Contractor may curve stringers and girders using a combination of line heats applied to the edge of both flanges simultaneously with automatic track torches and "V" heats. "V" heats shall have an included angle of 15-30 degrees and a minimum height of 65% of the flange width. Apply heat to adjacent areas on both flanges simultaneously.

Perform all cambering and curving in the presence of the QAI. Heating a structural member without the QAI present shall be cause for rejection of the member. Measure and record camber and sweep after the steel has reached ambient temperature and all stiffeners and connection plates have been welded.

~~504.26 Welding~~ Qualify welders and ~~Weld Procedure Specification~~PSs in accordance with the ~~most recent edition of~~ the D1.5 Code. Provide a list of qualified welders including process and position to the QAI prior to beginning fabrication. Submit the ~~Weld Procedure Specifications~~WPS to the Fabrication Engineer for review prior to beginning work. ~~Weld Procedure Specification~~WPSs previously reviewed and still valid in accordance with the D1.5 Code are acceptable without re-submission.

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504.27 Welding Requirements Calibrate welding equipment at the intervals indicated in the D1.5 Code. Meters shall be accurate within 2% throughout the range of the WPS. Work done with equipment that is not properly calibrated will be rejected. Provide copies of the calibration records to the QAI. The QAI can require the Contractor to demonstrate the accuracy of the meters at any time.

~~Display a copy of the applicable [Weld Procedure SpecificationPS](#) at each welding station. Weld within the parameters of the [Weld Procedure SpecificationPS](#). Failure to display a [Weld Procedure SpecificationPS](#) at the welding station will make all welding performed at that station subject to rejection.~~

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Perform all preheat, welding and postheat in accordance with the D1.5 Code and this Specification.

Provide the appropriate temperature indicating crayons at each workstation to verify preheat. Calibrated digital thermometers may be used with the approval of the Fabrication Engineer instead of temperature indicating crayons.

Weld flange plate and web plate butt joints, web to flange welds, stiffener and connection plate to web welds, and cover plate to flange welds using an automatic weld process.

Make repairs with the same process used for the original welds, except that repairs less than 12 inches in length may be made with a different process using an approved [Weld Procedure SpecificationPS](#). Do not blend repair welds by grinding unless the original weld requires grinding.

504.28 Welded Fabrication Each side of complete joint penetration welds, once begun, shall be welded to completion without interruption or a delay between passes except as necessary to maintain interpass temperature requirements. After backgouging, the groove and 3 inches on either side of the groove and through the thickness of the steel shall be preheated in accordance with the D1.5 Code immediately before the resumption of welding.

Single-pass fillet welds may be qualified by a Fillet Weld Soundness Test performed in accordance with the D1.5 Code as modified herein. Perform the "T" test by welding the smallest fillet weld to be used in production on one side and the largest fillet weld used in production on the other side of the "T". Macroetch the test specimens in accordance with the requirements of [Clause 57.18](#), Method of Testing Specimens, of the D1.5 Code. Acceptance and re-testing, if required, shall be in accordance with [Clause 7.195](#) Test Results Required and [Clause 7.20](#) Retests, of the D1.5 Code.

The minimum heat input for single-pass fillet welds during testing and production shall be 35 kilojoules/in.

504.29 Welding ASTM A 709 HPS 70W Steel In addition to 504.28, use the most recent edition of the D1.5 Code and the Fab Guide as amended herein when welding ASTM A 709 Gr. HPS 70W. Use only consumables that produce weld metal with diffusible hydrogen of H₈ or less. Handle and store consumables in accordance with the requirements of [Clause 12](#) of the D1.5 Code. Preheat in accordance with [Clause 4-6](#) of the D1.5 Code through the thickness of the steel and three inches in all directions from the weldment. Failure to properly preheat the steel will result in rejection of the weld metal. Remove and re-weld rejected weldments.

HPS 70W may be joined to Grade 50W steel using a Weld Procedure Specification ~~PS~~ qualified for Grade 50W steel if the diffusible hydrogen content of the deposited weld metal is H_2 or less. Use minimum preheat temperature for Gr. HPS 70W in accordance with the D1.5 Code.

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504.30 Nondestructive Testing Perform nondestructive testing in accordance with the D1.5 Code and these Specifications. The QAI will witness nondestructive testing. Give the QAI adequate notice to facilitate the QAI's presence. Failure to notify the QAI will result in re-testing with the QAI present. Document nondestructive testing on the appropriate forms from Annex III of the D1.5 Code, or an equivalent form.

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504.31 Shop Assembly Assemble stringers and girders in accordance with the shop assembly drawings. Measure and record the bearing-to-bearing dimensions, the bearing-to-field-splice dimensions and the offset from the reference line dimensions as shown on the shop assembly drawings. Give the QAI the opportunity to verify the measurements prior to disassembly.

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504.32 Tolerances Dimensional tolerances for welded plate girders are described in the D1.5 Code. Dimensional tolerances for rolled shapes are described in AASHTO M 160 (ASTM A6). The tolerance for the length of any primary bridge member is $\pm 1/4$ inch. The bearing-to-bearing tolerance is $\pm 1/8$ inch. The bearing elevation tolerance is $\pm 1/8$ inch. The offset tolerance for bolted field splices is $\pm 3/4$ inch.

504.33 Match marking Match mark drill assembled or ream assembled field splice material prior to disassembly. Preserve the match marking through field erection.

504.34 Holes for High Strength Bolts Oversize holes are not allowed unless noted on the Plans. Drill bolt holes full-size. Splice plates may be used as one-time templates to drill webs and flanges. The plates shall remain with the splice. Replace damaged plates used as a template. The Contractor may temporarily tack weld web splice plates to the web in the middle 1/3 of the web only. Completely remove tack welds by grinding and MT the tack areas. Do not tack weld flange splice plates to flanges.

Holes for cross frames, diaphragms and associated connection plates may be punched when the thickness of the plate is $\leq 3/8$ inch. The diameter of the die shall not exceed the diameter of the punch by more than $1/16$ inch. Holes shall be clean cut, without torn or ragged edges.

Make holes cylindrical and perpendicular to the member. Remove burrs from parts after drilling or reaming. Remove all visible drilling oil, lubricants and coolants, including water soluble lubricants and coolants from faying surfaces in accordance with SSPC-SP 1-Solvent Cleaning.

The Contractor may thermal cut holes in bearing base plates using an automatic process. Do not exceed a surface roughness of ANSI 1000 micro-inches.

504.35 Accuracy of Holes Following the completion of the drilling of holes in a contiguous group, with all plies of a connection in their proper position for assembly, all bolt holes shall accept a pin 1/32 inch smaller in diameter than the nominal bolt hole diameter. Provide a pin of the applicable diameter for inspection purposes.

No finished bolt hole shall be located more than 1/8 inch from its theoretical location. The repair of mislocated holes shall be subject to the approval of the Fabrication Engineer.

504.36 Shop Bolts Install shop bolts in accordance with this Specification except that adequately lubricated fastener assemblies that have been Rotational Capacity (Ro Cap) tested by the supplier do not need to be Ro Cap tested prior to installation. As an alternative, Tension Control (TC) bolts meeting the requirements of ASTM F1852 may be used with the approval of the Fabrication Engineer. Submit a tensioning procedure for TC bolts to the Resident for review.

504.37 Bearings Finish bearings, base plates and other contact surfaces to the requirements of Section 523.

504.38 Marking and Delivery Mark each piece as shown on the Shop Drawings. Place erection marks, match marks and piece marks where they will not be exposed on the finished structure.

Notify the Fabrication Engineer after the girders and stringers have been loaded on trailers and prior to shipment. Furnish the Resident copies of shipping documents and erection diagrams.

Package bolts of each length and diameter, along with the required number of nuts and washers in waterproof containers. Attach a list of the fastener assemblies, including the identifying shipping lot number and Rotational-Capacity lot number in a waterproof envelope to the outside of the container.

504.39 Handling and Storing Materials Store beams and girders in an upright position on platforms, skids or other supports above the ground. Support material in a manner that will prevent damage due to excessive deflection and torsion. Do not use chains and wire rope slings in direct contact with fabricated members when being lifted or transported. Store bolts under sheltered conditions at all times.

BRIDGE STEEL ERECTION

504.40 Plans Provide the Resident with a steel erection plan for review prior to beginning steel erection. Schedule a pre-steel erection meeting at the jobsite prior to the delivery of the steel to discuss the erection plan, personnel qualifications, adequacy of tools and equipment and any other areas of concern to the Resident. If fabrication and erection of

the Superstructure are done under separate contracts, the Department will furnish detailed Plans for the Bridge or Bridges to the Contractor.

504.41 Methods and Equipment Submit plans for any false work and/or modifications to an existing structure necessitated by construction loading to the Fabrication Engineer. The false work and/or modifications shall be designed, constructed and maintained for the loads placed upon it. False work calculations and design shall be stamped by a licensed Professional Engineer. The review by the Fabrication Engineer shall not relieve the Contractor of the responsibility for the safety of the method, equipment or from carrying out the work in accordance with the plans and Specifications. Do not build or erect false work until the Fabrication Engineer has reviewed and returned the plan.

504.42 Bearings and Anchorages Finish bridge seats true to line and grade. Do not place bearings upon bridge seats that are improperly finished.

Cast anchor rods in place or set them in drilled holes. If the anchor rods are set in drilled holes, use an anchoring material from the Department Qualified Products List. Anchor rods shall be capable of developing unconfined pullout strength of 30 Kips and 70 Kips for 1 inch and 1½-inch anchor rods respectively.

The Department reserves the right to perform in-place pullout tests. Replace bolts failing to meet the pullout strength requirements.

Set bearings so that they are plumb or centered at 45 ° F.

504.43 Assembling Steel Clean all faying surfaces before assembly. Use drift pins in both the web and flange connections to assure alignment of all holes. Use a minimum of eight drift pins in each flange and web connection. Install and tension a minimum of 50% of the bolts in each contiguous group before the member is released from the crane. Tension field splices within 72 hours of bolt installation. Protect splices from rain or other conditions that will, in the opinion of the Resident, degrade the lubrication on the bolts.

504.44 Connections Using High Strength Bolts Provide all necessary torque and power wrenches, calibration equipment, feeler gauges and labor required for the testing, calibration, installation and inspection of high strength bolts. Provide a tension-measuring device (Skidmore-Wilhelm or approved equal) and torque wrench, both of which have been calibrated within 12 months, and are in good condition. Provide calibration documentation. Both the tension-measuring device and the torque wrench shall remain at the job site during steel erection. The torque wrench shall have a maximum capacity that is approximately 100% greater than the anticipated job torque. Torque wrenches shall be equipped with a dial face gauge and a memory pointer that remains at the applied torque reading. Torque wrenches shall be graduated in increments not to exceed two percent of the maximum capacity of the wrench and shall be readable to one percent of the maximum capacity.

504.45 Bolts, Nuts, Washers and Direct Tension Indicators Protect fasteners from dirt and moisture. Take only as many fasteners as anticipated to be installed during a work shift

from protected storage. Return unused fasteners to protected storage at the end of the workday. Clean and lubricate rusty and dirty fasteners prior to installation with a lubricant recommended by the bolt supplier or manufacturer. Tension Control (TC) fasteners shall only be re-lubricated by the manufacturer.

Surfaces in contact with the bolt head and nut shall not have a slope more than 1 to 20 with respect to a plane normal to the bolt axis. Where an outer face of the bolted parts has a slope of more than 1 to 20 with respect to a plane normal to the bolt axis, a hardened beveled washer shall be used. Bolted parts shall fit solidly together when assembled. All faying surfaces shall be free of mill scale, dirt, burrs, or other material that would prevent solid seating of the parts.

Install bolts with a hardened washer under the element turned in tightening. Hardened washers are required over slotted and oversize holes.

504.46 Fastener Assemblies for Testing Provide fastener assemblies (bolt, washer, nut and DTI, if required) to the Resident two weeks prior to beginning steel erection for testing. Randomly select and package four assemblies of each lot, length and diameter for independent verification testing. Identify each size fastener assembly separately with the lot numbers of the bolt/washer/nut/DTI combinations clearly marked. The cost of the assemblies is incidental to the appropriate contract items. Replace unacceptable fastener assembly lots.

504.47 Verification Perform a Rotational Capacity Test (RCT) for each Rotational Capacity (R-C) lot at the job site immediately prior to installation. Do not use fasteners assemblies that have been used to perform the RCT in the final assembly of the steel.

If DTI's are used, perform a DTI Verification Test for each production lot immediately prior to installation.

Give the Department adequate notification in order to witness both the RCT and DTI verification tests.

504.48 Rotational Capacity Test The RCT is intended to verify the effectiveness of the lubricant and the compatibility of the components of the fastener assembly. The test shall be conducted using a tension-measuring device (Skidmore-Wilhelm or equivalent) and a torque wrench. Select two fastener assemblies of each length and diameter from each R-C lot. Perform the RCT in the following manner:

1. Insert the fastener assembly in the tension-measuring device using enough hardened washers under the nut (a minimum of one) so that there is full nut engagement (threads flush with the end of the nut) and no more than 3 threads visible after the assembly is brought to a snug-tight condition with a hand wrench (approximately 10% of the Minimum Installation Tension from Table 1).

2. Mark the faceplate of the tension measuring device with a line at 0°, 120°, 180°, and 240°. Mark the torque wrench socket so that the total amount of nut rotation can be measured and recorded. Note: the lines are for measuring total rotation of the turned element and have nothing to do with minimum installation tension.

3. Bring the fastener assembly to *at least* the Minimum Installation Tension from Table 1 using the torque wrench.

4. At a point *after* the required Minimum Installation Tension has been achieved, measure and record the tension and the torque. Take the reading as close as possible to the Minimum Installation Tension from Table 1.

Table 1

Minimum Installation Tension Requirements and Turn Test Tension-U.S. Customary

Bolt Diameter (inches)	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8
Installation Tension (kips)	19	28	39	51	56	71	85
Turn Test Tension (kips)	22	32	45	59	64	82	98

5. Further tighten the fastener assembly to the total rotation (from snug tight) specified in Table 2 below:

Table 2

Total Fastener Rotation from Snug Tight

Bolt length up to and including 4 diameters	2/3 turn (240 degrees)
Bolt length over 4 diameters up to and including 8 diameters	1 turn (360 degrees)
Bolt length over 8 diameters and less than 12 diameters	1-1/6 (420 degrees)
12 diameters and greater	test not applicable

6. Measure and record the tension after total rotation of the nut. The measured tension must be equal to or greater than the Turn Test Tension value shown in Table 1 for the diameter bolt being tested. If the measured tension is less than the required Turn Test Tension, the fastener assembly has failed.

7. Upon completion of steps 1 through 6:

(a) The torque measured in step 4 shall not exceed the value obtained by the following equation:

Measured Torque $\leq 0.25PD$ Where:

P = Measured Bolt Tension -pounds (Step 4)

D = Nominal Bolt Diameter -feet

(bolt diameter in Inches divided by 12)

- (b) If the torque measured in step 4 is greater than the torque calculated in step 7, the fastener has failed the test. Re-lubricate all fasteners in the lot and re-test.
- (c) Disassemble each fastener assembly and run the nut down the full length of the threads excluding the grip length (the length between the bolt head and washer face of the nut). If evidence is found of torsional failure, shear failure or stripping of the threads, the assembly failed the test. Slight necking in the grip length is not a failure.
- (d) If either bolt assembly fails the test, the R-C lot has failed. Re-lubricate all bolts from that lot and perform the test again. If either bolt fails the second test, the R-C lot shall be rejected.

8. Test bolts that are too short to fit in the tension-measuring device in a solid joint such as a bearing stiffener or connection plate. The hole in the joint may not be more than 1/16 inch greater in diameter than the bolt being tested. Randomly select two fastener assemblies from each R-C lot. Mark the nut relative to the steel joint in such a manner that rotation can be measured. Snug tighten the bolt with a spud wrench using approximately the same effort used to snug-tighten longer bolts in a tension measuring device. Restrain the bolt with a wrench to prevent rotation. Rotate the nut from snug tight to 1/3 turn with a torque wrench. Record the torque required to reach that rotation while the turned element is in motion. If the measured torque exceeds the maximum torque listed in Table 3 the fasteners have failed the test. If the fasteners fail the first test, re-lubricate all fasteners from that R-C lot, randomly select two samples and re-test. If there is no stripping or fracture the fasteners pass. If the either fastener fails the second test, the R-C lot is rejected.

Table 3
Maximum Allowable Torque

Bolt Diameter (inches)	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Torque (ft-lbs)	500	820	1230	1500	2140	2810	3690

- 9. Discard bolts used for the Rotational Capacity Test.

504.49 DTI Verification Test Perform the DTI Verification Test for each production lot of DTIs in combination with each R-C lot of fasteners. If any of the three test assemblies fails, three additional samples from the same production lot shall be tested as the first. If any of the three samples fails the second test, the lot shall be rejected. Perform the test in TWO STEPS:

- 1. Step 1 is a test to determine that the DTI's are acceptable when the fastener is brought to the minimum allowable tension.
 - a) Randomly select three fastener assemblies from each R-C lot.
 - b) Install each bolt in the tension-measuring device with the bolt head bearing against the faceplate (the front of the tension-measuring device). Place the DTI under the

bolt head with the protrusions bearing against the washer face of the bolt. This is done so that the DTI is accessible for inspection with a feeler gauge. Install the nut and hardened washer using a filler sleeve between the bolt bushing (the back of the tension-measuring device) and the hardened washer under the nut. Two or more hardened washers may be used under the nut instead of a filler sleeve if the washers do not interfere with the proper operation of the tension-measuring device. When the bolt is brought to snug-tight condition, there should be 3 to 5 threads visible.

c) Using two wrenches, one to restrain the unturned element of the bolt assembly, tighten the nut to the Bolt Tension listed in Table 4. If an impact wrench is used, tighten the bolt to approximately 50% of the required tension and use a torque wrench to bring the fastener to the required tension.

TABLE 4- Minimum Installation Tension

U.S. Customary							
Bolt Diameter (inches)	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2
Bolt Tension (kips)	20	29	41	54	59	75	108

d) Using a thickness gauge provided by the DTI manufacturer, record the number of spaces between the protrusions on the DTI that a 0.005 inch thickness gage is refused.

e) If the number of refusals exceeds the number in Table 5, the DTI has failed the DTI Verification Test for minimum tension. Reject the DTI lot.

TABLE 5

Bolt Diameter (inches)	3/4, 7/8	1, 1-1/8	1-1/4, 1-3/8
Number of Spaces in DTI	5	6	7
Maximum Number of gaps in which gage is refused *	2	2	3

*If the test is a coated DTI, the maximum number of spaces the gage is refused is the number of spaces on the DTI minus one

2. Step 2 is to determine the maximum bolt tension allowable using a DTI.

a) After completing step 1, the bolt shall be further tightened to the smallest gap to be used during installation. Normally, this is defined as a condition where all gaps refuse a 0.005 inch gage but at least one visible gap remains.

b) Remove the bolt from the tension measuring device and turn the nut on the threads of the bolt by hand. If the nut can be run the length of the threads, excluding the thread run out, the DTI lot is acceptable. If the nut is unable to run the thread length at the smallest gap condition (defined in a) above), the test shall be performed again using a larger acceptance gap.

504.50 Installation and Tensioning High Strength Bolts Select one of the methods listed below for installing and tensioning high strength bolts. Do not use standard torque determined by the use of tables or formulas that attempt to relate torque to tension.

504.51 Installation Install a hardened washer under the turned element and a hardened washer on oversize holes. Install fasteners in all holes in a contiguous group, except for holes containing drift pins and bring them to a snug tight condition, progressing systematically from the most severely restrained location in a connection to the free edges. Do not remove the drift pins until a minimum of 50% of the fasteners have been tensioned. Do not force the bolts. If the bolts cannot be installed easily by hand, correct the hole alignment by installing more drift pins.

504.52 Tensioning Install and tension bolts by: (1) the Calibrated Wrench method, (2) the Turn of Nut method, (3) with Direct Tension Indicators or (4) Alternative Design Fasteners. Tension the fasteners systematically from the most rigid part of the joint to the free edges.

1. The Calibrated Wrench Method Adjustable pneumatic wrenches, adjustable hydraulic wrenches or torque wrenches may be used.

Calibrate the wrench used for tensioning bolts at least once each shift with fastener assemblies of each diameter, length and R-C lot to be installed. Calibrate pneumatic wrenches any time a section of hose has been added or eliminated. Calibrate pneumatic wrenches any time the compressor is changed.

Randomly select five fastener assemblies of each length and R-C lot for wrench calibration. Install each of the fastener assemblies in the tension measuring device and install enough washers so at least three but no more than five threads are showing. Install at least one hardened washer under the turned element. Snug the bolt using the same procedure to be used during installation.

If the wrench is an adjustable pneumatic wrench or an adjustable hydraulic wrench, set the adjustment so that each of the three assemblies is tensioned to no less than the Minimum Installation Tension specified in Table 4 above.

If a torque wrench is used, tension five randomly selected fastener assemblies to the minimum tension specified in Table 4. Record the torque readings. Discard the high and low torque reading. The job installation torque shall be the average of the three remaining torque values.

When bolts are too short to fit in the tension-measuring device, install five randomly selected fasteners in a solid joint with a hole diameter no greater than 1/16 inch the nominal bolt diameter. Rotate each assembly 1/3 turn and record the torque. Discard the high and low torque reading. The job installation torque shall be the average of the three remaining torque values.

Bolts used to calibrate wrenches may be re-used.

2. The "Turn of Nut" Method Perform the Turn of Nut calibration once, prior to fastener installation, for each diameter, length and R-C lot.

Select a random sample of no less than three fastener assemblies of each diameter, length and R-C lot. Install each assembly in a tension-measuring device. Bring the fastener assembly to snug tight (approximately 10% of the minimum installation tension from Table 4). Match mark the socket to reference points on the tension-measuring device in order to accurately determine nut rotation. Tighten the bolt to the required rotation specified in Table 6. Record the tensions for each diameter, length and R_C lot. The average of the three tension readings shall be no less than the Minimum Installation Tension specified in Table 4. If any of the three fastener assemblies does not achieve minimum installation tension at the specified rotation, select three more and re-test. Increase the minimum rotation if necessary.

Snug all the bolts in a contiguous group. Rotate the turned element the appropriate amount rotation specified in TABLE 6. The unturned element shall be held by a wrench to prevent rotation during tightening.

TABLE 6
Nut Rotation from Snug Tight ^{1, 2, 3}

Disposition of Outer Faces of Bolted Parts			
Bolt Length Measured from Underside of head to extreme of point	Both Faces Normal to Axis ³	One Face Normal to Bolt Axis and Other Face Sloped Not More Than 1 to 20 (bevel washer not used) ³	Both Faces Sloped Not More Than 1 to 20 from Normal to Axis (bevel washer not used) ³
Up to and including 4 diameters	1/3 turn	1/2 turn	2/3 turn
Over 4 diameters but not exceeding 8 diameters	1/2 turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 diameters ²	2/3 turn	5/6 turn	1 turn

¹ Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned.

² For bolts tensioned with 1/2 turn or less, the tolerance shall be plus or minus 30 degree. For bolts tensioned with more than 1/2 turn, the tolerance shall be plus or minus 45 degrees.

³ No research work has been performed by the Research Council on Riveted and Bolted Structural Joints to establish the turn-of-nut procedure when bolt lengths exceed 12 diameters, therefore, the required rotation must be determined by actual tests in a suitable tension-measuring device simulating the actual condition.

3. Tensioning Fastener Assemblies with DTI's Tension fasteners using DTI's so that a 0.005 inch feeler gage is refused in at least the number of gaps shown in Table 7 and a

minimum of one visible gap remains. Tightening beyond crushing the DTI shall be cause for rejection of the fastener assembly.

TABLE 7

Inspection Criteria for DTI's						
Number of gaps in DTI	4	5	6	7	8	9
Minimum number of gap refusals	2	3	3	4	4	5

4. Alternate Design Fasteners Alternate design fasteners that are designed to indicate bolt tension indirectly or tension bolts automatically may be used only with the approval of the Fabrication Engineer. Alternate design fasteners shall meet the chemical and mechanical requirements of AASHTO M 164M / M 164 (ASTM A 325/ A 325M) and shall have the same body diameter of similar traditional fasteners and not less than the same bearing area under the head and nut as a similar heavy hex fastener.

Provide a detailed written installation procedure from the fastener manufacturer to the Fabrication Engineer for approval prior to beginning bolt installation. The Fabrication Engineer may modify or place restrictions on the installation procedure prior to approval.

Calibrate three random samples in a tension-measuring device. Each fastener shall achieve the Minimum Bolt Tension from Table 4 when installed and tensioned in accordance with the approved installation procedure. If any of the three fasteners fails to achieve 100% of the Minimum Bolt Tension, a retest of five fastener assemblies from the same lot may be performed. If any of the five fastener assemblies fails to achieve 100% of the Minimum Bolt Tension, the lot shall be rejected. The Resident may require re-calibration of the fasteners if the condition of the fasteners has significantly changed.

Tension alternate design fasteners immediately after installation. Alternate design fasteners are extremely dependent on proper lubrication and thread condition. Handle and store fasteners in accordance with the manufacturer's recommendations. Fasteners that have been improperly handled or stored shall be rejected.

504.53 Inspection Inspect all completed joints within 72 hours following completion of tensioning each joint or contiguous group of fasteners.

Use the following inspection procedure:

1. The Contractor, in the presence of the Resident shall use a calibrated torque wrench as an inspection tool.

2. At least once each day, tighten a representative sample of five bolts from each diameter, length and Ro-Cap lot used in the work in the tension-measuring device to the Minimum Bolt Tension specified in Table 6. Place a washer under the turned element of each bolt assembly. The job inspection torque shall be the average of three values after rejecting the high and low values.

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3. Bolts represented by the sample in the preceding paragraph which have been tightened in the structure shall be inspected by applying, in the tightening direction, the inspection wrench and the job inspection torque to a minimum of 10% of the bolts, but not less than two bolts, selected at random, in each connection. If any nut or bolt is turned more than five degrees (approximately one inch at a twelve inch radius) by the application of the job inspection torque, all bolts in the connection shall be tested. Alternatively, the Contractor or Erector may re-tighten all the bolts in the connection before the specified inspection.

4. For joints using DTI's, inspection will consist of verifying that the DTI has the minimum number of refusals required from Table 9 and the minimum gap allowed in the work (from the DTI Verification Test) remains in at least one space.

5. At the Resident's option, if the Quality Assurance Inspector witnesses the initial and final tensioning of fasteners in a joint using the "Turn of Nut" method and finds it acceptable, no further inspection will be required.

504.54 Reuse of Bolts Reuse only black AASHTO M164M/M164 (ASTM A325/A325M) bolts. Do not reuse galvanized fasteners.

~~504.55 Field Welding and Repairs. Field welds shall be subject to the same standards as shop welds. Field welding and nondestructive examination testing of field welds shall be done in conformance with the requirements of the D-1.5 Code.~~

~~Structural steel that is damaged during construction, to include but not be limited to, saw cut damage, nicks/gouges, and deformations shall be repaired by the Contractor in accordance with Section 104.3.10. The Contractor shall submit a structural steel repair procedure for review by the Fabrication Engineer. The repair procedure shall be prepared by a licensed Professional Engineer in the State of Maine and the repair procedures shall be in accordance with the AASHTO/NSBA Guidelines for Field Repairs and Retrofits of Steel Bridges, G14.2-2023. No structural steel repairs shall commence without an approved repair plan.~~

~~When welding is anticipated per the Contract Plans and/or is required as part of a repair procedure, the Contractor shall submit a Field Welding QC Plan for review by the Fabrication Engineer.~~

~~The Field Welding QC Plan shall, at a minimum, contain the following pieces of information:~~

- ~~1) Scope of Anticipated Field Welding~~
- ~~2) WPSs/PQRs~~
- ~~3) QC Inspector Qualifications~~
- ~~4) Welder Qualification~~
- ~~5) NDT~~
 - ~~a. NDT Technician Qualifications~~
 - ~~b. Type/Quantity of NDT Required~~
- ~~6) Acceptance Criteria~~

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~~Qualify QC Inspectors and NDT Technicians in accordance with Section 504.061.~~

~~Qualify welders in accordance with Section 504.26.~~

~~Welding shall not be done when: the ambient temperature is below 0°F; the surfaces are damp or exposed to rain, snow, or high wind; or the welders or welding operators are exposed to inclement conditions.~~

~~Power sources for welders shall have meters indicating amperage/voltage that have been calibrated within 1 year at the time of welding.~~

~~The Contractor shall provide the Department with notice, a minimum of, 7 Days prior to the start of any welding.~~

~~Welders shall have in their possession a valid certification for the process and position to be used in production from the American Welding Society or other organization acceptable to the Resident.~~

~~Submit a written Weld Procedure Specification for each joint to the Fabrication Engineer for review. Provide the Weld Procedure Specification to the welder and Resident prior to beginning welding. Do not perform field welding without an approved Field Welding QC Plan and approved WPS(s) Weld Procedure Specification. Power sources shall have meters indicating amperage/voltage that have been calibrated within 1 year.~~

~~Field welding and nondestructive examination of field welds shall be done in conformance with the requirements of the D 1.5 Code.~~

504.56 Misfits The correction of misfits involving minor reaming will be considered a legitimate part of steel erection. Errors in shop fabrication or deformation from handling and transportation that prevents the proper assembling and fit-up of parts by the use of drift pins or by reaming (not to exceed 10% of the holes in a contiguous array) shall be reported immediately to the Resident. Provide a written proposal for correction to the Fabrication Engineer. Do not make any field corrections that involve cutting or welding without the permission of the Resident.

ANCILLARY BRIDGE PRODUCTS and SUPPORT STRUCTURES

~~504.57 Ancillary Bridge Products~~ Ancillary bridge products are defined in Subsection 713.01 of the Standard Specifications. Fabricate ancillary bridge products in accordance with the D1.5 Code as applicable to ancillary bridge products and this Specification. Welds attaching ancillary products to structural members shall meet all requirements of the D1.5 code. Fabricate tubular products in accordance with the AWS D1.1 Structural Welding Code (the D1.1 Code).

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~~Conformance with 504.56 shall not be required for minor misfits or for damage to the structure caused by handling or transportation. Reaming shall not be used to correct misfits. Reaming shall be done in accordance with the requirements of the D1.5 Code. Welds attaching ancillary products to structural members shall meet all requirements of the D1.5 code.~~

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504.58 Support Structures Weld support structures in accordance with the D1.1 Code. Support structures shall include, but not be limited to, non-vehicular bridges, high mast poles, light and signal poles, dual purpose poles, strain poles and sign supports; cantilever, bridge and butterfly support structures.

504.59 Materials Materials for ancillary bridge products will be specified in the Contract documents. When AASHTO M 270M/M 270 (ASTM A 709/A 709M) steel is specified for ancillary bridge products, equivalent ASTM grades of steel may be substituted. Provide Certified Mill Test Reports for all material.

504.60 Holes for Base Plates Holes in base plates may be drilled or thermal cut at the Contractor's option. The roughness shall not exceed condition of AWS C4.1-77, Sample 4. Do not deviate from specified dimension for thermal cut holes by more than 1/16 inch in any direction.

504.61 Bolted Connections Holes for bolted connections shall meet the requirements of Subsections 504.34 and 504.35. High strength bolts shall be installed, tensioned and inspected in accordance with Subsections 504.50 through 504.54.

504.62 Anchor Rods Anchor rods shall be as shown on the Plans or in the Standard Details. Anchor rods shall meet the material requirements of 720.07.

504.63 Support Structures Qualify Weld Procedure Specifications, welders and welding operators in accordance with the D1.1 Code.

Circumferential shop splices for poles shall be full penetration, butt welds. Welded longitudinal seams shall have 100 percent penetration for 6 inches on either side of a shop splice, and for the splice length plus 6 inches at the field splice end(s) of a shaft section. The remainder of the seam weld shall have a minimum effective weld throat of 60 percent of the wall thickness. Pole to base welds may be complete joint penetration welds or socket-type joints with two fillet welds.

Prior to erection, the assembled shaft or structure shall not exhibit a sweep in excess of 0.2 percent of the nominal pole height or length, as measured with the pole or structure in a horizontal position. Shafts that are to remain unpainted shall have the lower edge of all field slip connections sealed around the entire circumference with a sealant that will remain flexible and not degrade from exposure to ultraviolet light.

504.64 Non Destructive Testing-Ancillary Bridge Products and Support Structures
Unless otherwise specified, nondestructive testing shall be as follows:

1. Examine ten percent of fillet or partial penetration welds on each production lot using Magnetic Particle (MT) inspection. If any welds examined require a welded repair, an additional ten percent of the original lot number will be examined using MT. If any welds in the second ten percent require a welded repair, test all welds in that production lot using MT.

2. For the purposes of this Specification, a production lot shall be defined as a day's production of small parts (e.g. post to base welds), each discrete segment of complex structures (e.g. overhead sign supports, mast arm poles, etc.) or other grouping or unit not to exceed one week's production at the discretion of the Fabrication Engineer.

3. Inspect one hundred percent of all circumferential welds and the full penetration sections of the longitudinal seam welds by radiographic examination (RT). Inspect one hundred percent of tube to plate welds: full penetration by RT, partial penetration and fillet by MT. Inspect twenty five percent of the partial penetration sections of the longitudinal seam welds (MT). Ultrasonic testing (UT) may be used on material $\geq$ (5/16 inch) thick and properly qualified UT may be used on thicknesses $<$ 5/16 inch.

504.65 Method of Measurement Unless otherwise specified, structural steel will be measured as one lump sum complete and accepted, consisting of all metal and related materials in the fabricated and erected structure as shown on the Plans, excluding railings and drains. Related materials shall include, but not be limited to, preformed pads placed under the bearings and, when required, self-lubricating bronze or copper-alloy bearing and expansion plates.

504.66 Basis of Payment Structural steel will be paid for at the contract lump sum price for the respective contract items.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
504.70 Structural steel fabricated and delivered,	Lump Sum
504.701 Structural steel fabricated and delivered, roll	Lump Sum
504.702 Structural steel fabricated and delivered, welded	Lump Sum
504.71 Structural steel erection	Lump Sum

~~SECTION 505—STUD WELDED SHEAR CONNECTORS, ANCHORS, & FASTENERS~~

~~505.01 Description This work consists of furnishing and installing steel stud welded shear connectors, concrete anchors and threaded fasteners in accordance with the AASHTO/AWS D1.5 Bridge Welding Code (D1.5) and these Specifications:~~

~~505.02 Materials Materials shall meet the requirements of Section 711.06—Stud Shear Connectors, Anchors, and Fasteners. The Contractor shall provide the stud manufacturer's certification that the studs meet the material requirements prior to beginning welding.~~

505.03 Quality of Work The studs shall be free from rust, scale, oil, and other contaminants that would adversely affect the welding operation.

Weld locations shall be free of scale, rust, oil and other deleterious material. The Contractor may clean the weld locations by any method that results in satisfactory welds.

The arc shields, or ferrules, shall be kept dry. Ferrules showing signs of moisture shall be oven dried at 250 degrees Fahrenheit for two hours prior to use.

The longitudinal spacing of shear connectors shall vary no more than ± 1 inch from that shown on the Plans. The minimum edge distance shall be 2 inches.

Arc shields or ferrules shall be removed from studs after welding.

505.04 Technique Studs shall be welded with automatically timed stud welding equipment connected to a suitable direct current, electrode negative (DCEN) power source.

If more than one stud welding gun is operated from the same power source, they shall be interlocked so that only one gun can operate at one time.

Welding shall not be done when the base metal temperature is below zero degrees Fahrenheit or when the surface is wet or exposed to rain or snow.

Studs may be fillet welded using SMAW with the approval of the Resident.

505.05 Construction Requirements At the beginning of each day or shift and after any change in set up, the first two studs welded shall be tested. The studs shall be visually inspected for a full 360 degrees weld flash. The studs shall be bent a minimum of 30 degrees from their original axis with a hammer, pipe or other hollow device. If either stud fails the visual or bend test, the Contractor shall correct the procedure and weld two more studs to separate material representative of the grade and thickness of the material being welded in production. This procedure shall continue on separate plates until the Contractor has successfully welded two consecutive studs.

While in operation, the welding gun shall be held in position without movement until the weld metal has solidified.

If an unacceptable stud has been removed from an area subject to tensile stresses or stress reversal, the weld area shall be ground flush. If base metal has been pulled out in the course of stud removal, the pocket shall be filled by welding in accordance with the field welding requirements of Section 504 - Structural Steel. The weld shall be ground flush. Base metal repairs in compression areas shall be the same as the repairs for tension areas except that if the depth of the pocket is less than $\frac{1}{8}$ inch it shall be faired out by grinding. Replacement studs shall be welded no closer than 1 inch from the repair area.

~~505.051 Inspection~~ Studs will be visually inspected for a full 360 degrees weld flash. Studs not having a full 360 degrees weld collar shall be bent 30 degrees from its original position in a direction away from the missing weld flash. Studs not developing a crack or tear will be considered acceptable. Failing studs shall be removed, replaced and weld areas repaired.

~~505.06 Method of Measurement~~ Shear connectors shall be measured as one lump sum, consisting of all shear connectors required and acceptably installed. Stud welded anchors and fasteners will be considered incidental to the pay item for which they are required.

~~505.07 Basis of Payment~~ The accepted quantity of shear connectors will be paid for at the lump sum price.

Payment will be made under:

Pay Item _____
Pay Unit

505.08 Shear Connectors _____ Lump Sum

SECTION 505 - STUD WELDED SHEAR CONNECTORS, ANCHORS, & FASTENERS

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505.01 Description This work consists of furnishing and installing steel stud welded shear connectors, concrete anchors and threaded fasteners in accordance with the AASHTO/AWS D1.5 Bridge Welding Code (D1.5) and these Specifications.

505.02 Materials Materials shall meet the requirements of Section 711.06 - Stud Shear Connectors, Anchors, and Fasteners. The Contractor shall provide the stud manufacturer's certification that the studs meet the material requirements prior to beginning welding.

505.03 Quality of Work The studs shall be free from rust, scale, oil, and other contaminants that would adversely affect the welding operation.

Weld locations shall be free of scale, rust, oil and other deleterious material. The Contractor may clean the weld locations by any method that results in satisfactory welds.

The arc shields, or ferrules, shall be kept dry. Ferrules showing signs of moisture shall be oven dried at 250 degrees Fahrenheit for two hours prior to use.

The longitudinal spacing of shear connectors shall vary no more than ± 1 inch from that shown on the Plans. The minimum edge distance shall be 2 inches.

Arc shields or ferrules shall be removed from studs after welding.

505.04 Technique Studs shall be welded with automatically timed stud welding equipment connected to a suitable direct current, electrode negative (DCEN) power source.

If more than one stud-welding gun is operated from the same power source, they shall be interlocked so that only one gun can operate at one time.

Welding shall not be done when the base metal temperature is below zero degrees Fahrenheit or when the surface is wet or exposed to rain or snow.

Studs may be fillet welded using SMAW with the approval of the [Resident Fabrication Engineer](#).

505.05 Construction Requirements At the beginning of each day or shift and after any change in set-up, the first two studs welded shall be tested. The studs shall be visually inspected for a full 360 degrees weld flash. [In addition to visual examination, the test shall consist of bending the studs after they are allowed to cool, to an angle of approximately 30° from their original axes by either striking the studs on the head with a hammer or placing a pipe or other suitable hollow device over the stud and manually or mechanically bending the stud. At temperatures below 50 °F, bending shall preferably be done by continuous slow application of load. The studs shall be bent a minimum of 30 degrees from their original axis with a hammer, pipe or other hollow device.](#)

[If on visual examination the test studs do not exhibit 360° flash, or if on testing, failure occurs in the weld zone of either stud, the WPS shall be corrected, and two more studs shall be welded to](#)

separate material or on the production member and tested as stated above. If either of the second two studs fails, additional welding shall be continued on separate plates, which are representative of the grade and thickness of the material being welded in production, until two consecutive studs are tested and found to be satisfactory before any more production studs are welded to the member. If either stud fails the visual or bend test, the Contractor shall correct the procedure and weld two more studs to separate material representative of the grade and thickness of the material being welded in production. This procedure shall continue on separate plates until the Contractor has successfully welded two consecutive studs.

While in operation, the welding gun shall be held in position without movement until the weld metal has solidified.

If an unacceptable stud has been removed from an area subject to tensile stresses or stress reversal, and no base metal has been removed, the weld area shall be ground flush with the grinding performed parallel to the direction of primary stresses (i.e., with the girder direction). If base metal has been pulled out in the course of stud removal, the pocket shall be filled by welding member shall be repaired in accordance with the field welding requirements of Section 504—Structural Steel.55 Field Welding and Repairs.

The weld shall be ground flush. If an unacceptable stud has been removed from an area subject to compression, Bbase metal repairs in compression areas shall be the same as the repairs for tension areas except that if the depth of the pocket is less than $\frac{1}{4}$ inch it shall be faired out by grinding. Replacement studs shall be welded no closer than 1 inch from the repair area.

505.051 Inspection Studs will be visually inspected for a full 360 degrees weld flash. Studs not having a full 360 degrees weld collar shall be bent 30-15 degrees from its original position in a direction away from the missing weld flash. Studs not developing a crack or tear will be considered acceptable and may remain in the bent position. Failing studs shall be removed, replaced and weld areas repaired.

Commented [JS1]: 30 degrees is the bent for first 2 production studs. 15 degrees in D1.5 code for routine inspection of other stud welds missing 360 flash weld.

505.06 Method of Measurement Shear connectors shall be measured as one lump sum, consisting of all shear connectors required and acceptably installed. Stud welded anchors and fasteners will be considered incidental to the pay item for which they are required.

505.07 Basis of Payment The accepted quantity of shear connectors will be paid for at the lump sum price.

Payment will be made under:

<u>Unit</u>	<u>Pay Item</u>	<u>Pay</u>
505.08 Shear Connectors		Lump Sum

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Meservier, Patrick P

From: Macdougall, George
Sent: Thursday, November 6, 2025 10:01 AM
To: Furber, Melanie G
Subject: FW: The Association for Materials Protection and Performance (AMPP)

This isn't too bad...

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George M.A. Macdougall P.E. | Contracts and Specifications Engineer
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"Don't judge each day by the harvest that you reap, but by the seeds that you plant." Robert Louis Stevenson

From: Stetson, Jason B <Jason.B.Stetson@maine.gov>
Sent: Thursday, November 6, 2025 9:40 AM
To: Shepherd, Eric <Eric.Shepherd@maine.gov>; Anderson, Devin <Devin.Anderson@maine.gov>
Cc: Macdougall, George <George.Macdougall@maine.gov>
Subject: RE: The Association for Materials Protection and Performance (AMPP)

506.08 Applicator Qualification Shop-applied paint systems shall be applied by applicators that hold a current AISC Sophisticated Paint Endorsement (SPE) or are qualified in accordance with NACE NIICAP. Thermal Spray Coating (TSC), including sealers and top coating shall be applied at facilities with a minimum of five years' experience with additions of the certifications in the previous section or qualified in accordance with SSPC-QP6, Contractor Metallizing. Fusion bonded coatings and hot-dip galvanizing shall be applied in facilities with a minimum of five years' experience of satisfactory performance. The Fabrication Engineer may accept other shop qualifications based on experience and/or an audit by the Department.

AISC Sophisticated Paint Endorsement (SPE) is now AISC Complex Coatings Endorsement (CCE)

NACE NIICAP is unchanged, as far as I can tell.

SSPC-QP6, Contractor Metallizing should be AMPP QP 6, Contractor Metallizing.

New Items
Added

SECTION 507 - RAILINGS

507.01 Description This work shall consist of furnishing all materials for, and construction of, bridge rail, handrail, barrier mounted bridge rail, and steel approach rail in accordance with these specifications and the lines and grades shown on the Plans.

507.02 Materials Materials shall meet the requirements of the following Sections of Division 700 - Materials:

Steel Bridge Rail:	Structural Steel	713.01
	Preformed Pads	713.03
Aluminum Rail:	Preformed Pads	713.03
	Aluminum Railings	716.01

Pipe for Steel Pipe Hand Railing shall conform to the requirements of ASTM A53, Grade A or B.

507.03 Drawings The contractor shall prepare shop detail, erection, and other necessary Working Drawings in accordance with the requirements of Section 105.7, Working Drawings.

507.04 General Anchor bolts or anchor bolt sleeves shall be set with a template and shall be securely placed in their final position prior to the placement of the embedding concrete. Post anchor assemblies shall be installed to within $\frac{3}{16}$ inch of the theoretical horizontal and vertical location. No field drilling will be allowed to install anchor bolts without approval of the Resident. Post bearing areas shall be dressed smooth and true to grade. Prior to post erection, each rail post location shall be finished to the theoretical elevation determined from profile grade, cross slope and curb height and will not be acceptable until it is within $\frac{3}{16}$ inch of the theoretical elevation, as measured at the top of concrete. Preformed pads shall be used to adjust the rail posts for height and alignment. The number of preformed pads supplied shall be 10 percent more than the theoretical minimum number required. After erection of the railing, the Contractor shall clean the whole assembly, to present a neat and uniform appearance.

Approach railings shall be positioned so as to provide a neat and smooth transition from the bridge railing to the highway guardrail, without kinks or abrupt change in orientation. Embankment material around the approach rail posts shall be thoroughly compacted. Curbing shall be set flush with the face of the bridge curb.

On 4-bar approach railing installations, the bottom tube rail that extends past the approach railing under the bridge transition guardrail will be considered part of this work. HSS spacer blocks and all hardware to attach bottom rail to guardrail posts will also be considered part of this work.

507.05 Steel Bridge and Approach Railing Steel railings shall be fabricated in accordance with the requirements of Section 504, Structural Steel. When called for on the Plans, railings shall be galvanized and/or coated in accordance with Section 506, Shop Applied Protective Coating- Steel.

Rail bars to be used on a radius of 1,000 feet, or less, shall be curved before the application of any galvanizing and/or coating. Bending tolerance from theoretical horizontal curvature shall be plus or minus $\frac{1}{8}$ inch per yard, not to exceed $\frac{1}{2}$ inch, total.

507.06 Steel Pipe Hand Railing Steel pipe hand railings shall be fabricated in accordance with the requirements of Section 504, Structural Steel. When called for on the Plans, railings shall be galvanized and/or coated in accordance with Section 506, Shop Applied Protective Coating- Steel.

507.07 Aluminum Bridge Railing Aluminum sections may be sheared, sawed, or milled. Cut edges shall be smooth and free of burrs.

Holes for rivets shall be drilled full size from the solid or sub punched and reamed.

Rivets shall be cold-driven in the "as-received" condition and the driven head shall be of the cone-point type.

Welding shall be done in conformance with the latest edition of AWS Structural Welding Code-Aluminum D1.2 (AWS D1.2). No welding shall be performed before the approval of the appropriate weld procedures. No field welding is permitted.

All welds shall be inspected and conform with AWS D1.2, Clause 5, Inspection. 100% of welds shall be visually examined (VT). In addition to VT, 10% of all partial joint penetration (PJP) and fillet welds shall be dye penetrant tested (PT); locations to be PT examined will be designated by the QAI. 25% of complete joint penetration (CJP) welds shall be either, ultrasonic tested (UT) or PT based on the thinner material in the welded joint; joints with thinner material thicknesses less than 0.25 inch shall be PT examined and joints with thinner material thickness equal or greater than 0.25 inch shall be UT examined. Locations to be UT examined will be designated by the QAI. Extent of testing shall conform with AWS D1.2, Clause 5.

To facilitate bending, aluminum extrusions of Alloy 6061-T6 or 6351-T5 may be heated to a maximum temperature of 400 degrees Fahrenheit for a period of not more than thirty minutes.

Threaded fasteners shall conform to the requirements of ANSI Standard B 1.1, Class 2A for external and Class 2B for internal threads.

507.08 Method of Measurement Bridge or Hand Railing will be measured as one lump sum unit, fabricated, delivered, erected, and accepted.

Approach Railing will be measured as one unit for each transition, fabricated, delivered, erected, and accepted.

507.09 Basis of Payment Bridge or Hand Railing will be paid for at the Contract lump sum price, complete in place. Payment for galvanizing and/or protective coating, when required, shall be included in the lump sum price.

Approach Railing will be paid for at the Contract unit price for each installation. Such payment includes fabrication and installation of the railing components, attachment to the bridge railing system and guardrail transition, bottom tube rail for 4-bar approach railing, and any related connection hardware.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
507.0811 Steel Bridge Railing, 2 Bar	Lump Sum
507.0812 Steel Approach Railing, 2-Bar	Each
507.08161 Steel Approach Railing, 4-Bar	Each
507.0821 Steel Bridge Railing, 3 Bar	Lump Sum
507.0822 Steel Approach Railing, 3 Bar	Each
507.0831 Steel Bridge Railing, 4 Bar	Lump Sum
507.0841 Steel Pipe Hand Railing	Lump Sum
507.0846 Barrier Mounted Steel Bridge Rail: 1 Bar	Lump Sum
507.0848 Barrier Mounted Steel Bridge Rail: 2 Bar	Lump Sum
507.0951 Aluminum Bridge Railing, Pedestrians	Lump Sum
507.0961 Aluminum Bridge Railing, Pedestrian, with Pales	Lump Sum

New →
New →

SECTION 510 - SPECIAL DETOURS

510.01 Description This work shall consist of the design, construction, maintenance in good condition and removal of temporary structures and approaches required for the satisfactory maintenance of vehicular and pedestrian traffic.

Easements or right-of-way for the Special Detour will be furnished by the Department and will be shown on the Contract Plans. If the Contractor proposes an alternative location for the Special Detour, and the alternative location is approved by the Department, that easement may only be acquired by the Department. All additional costs associated with the acquisition, including, but not limited to, obtaining easements, environmental mitigation, restoration and Department time, shall be borne by the Contractor.

510.02 Materials Materials used for the Special Detour structure and approaches shall conform to the detailed plans and specifications submitted by the Contractor.

510.03 Vehicular and Pedestrian Traffic Not Separated The Special Detour shall be located as close as practicable to the new Work, or as shown on the Plans.

The Special Detour, including the temporary structure and approaches, shall be designed and sealed by a Professional Engineer, licensed in accordance with the laws of the State of Maine. The Contractor shall submit the design computations and detailed plans of the temporary structure and approaches that will serve as the ~~temporary-Special d~~ Detour to the Resident-Department for review prior to beginning construction of the Special Detour. Review will be according to Section 105.7 Working Drawings.

If the Department requires changes to the Temporary-Special Detour plans or computations, based on Contract requirements, then the Contractor shall implement the changes at no additional cost to the Department.

The Department shall have no obligation to review or comment on any design, construction, maintenance or removal of Temporary-Special Detours. No review or comment by the Department, or any lack of review or comment by the Department, shall relieve the Contractor of its responsibility to properly design, construct, maintain in good condition, and remove Temporary-Special Detours in accordance with the Contract, or shall shift any responsibility to the Department. The Contractor shall be responsible for all damages resulting from the failure of temporary structures or approaches.

The Special Detour shall not be opened to traffic until the Contractor's Professional Engineer inspects the temporary structure and provides the Department with a signed and sealed document certifying that the structure was built in accordance with the previously submitted sealed plans and design details of the structure and approaches.

510.031 Structure Design Temporary structures shall be designed in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications, except as noted herein, and meet live load requirements of HL-93, Maine Modified. Overstress will not be

permitted for any structural or foundation element. Structural elements considered as bracing shall be proven by calculation to meet strength and stiffness requirements.

a. Deflections Primary structural members shall be designed so that deflection due to live load plus impact shall not exceed 1/300 of the span.

b. Fatigue Stresses Fatigue stresses for steel need not be considered if the steel is judged by the Contractor's Professional Engineer to be in sound structural condition.

c. Bridge Railing Loads Bridge railing shall be designed in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications meeting the geometry and load demands of Test Level 3.

d. Waterway Opening The minimum waterway opening of the temporary structure shall be designed to pass the Design Discharge indicated in the Contract Specifications, without any overtopping of the roadway.

e. Foundations Temporary foundations, embankment foundations and earth retaining structures shall be designed in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications and AASHTO LRFD Bridge Construction Specifications, except as noted herein. The Contractor is responsible for determining the ultimate load carrying capacity of the foundation materials and foundation elements for the Special Detour. The determination of the ultimate load carrying capacity may require characterization of the subsurface conditions by the Contractor by means of subsurface investigation.

Foundations shall be designed for all applicable loads, forces, and load combinations. Load and force assumptions as well as load and resistance factors used for each foundation design shall be clearly stated in the submitted calculations.

510.032 Geometric and Approach Design The geometric design of the Special Detour, except as otherwise shown on the Plans or as noted herein, shall be designed in accordance with the current AASHTO Specification "A Policy on Geometric Design of Highways and Streets".

a. Horizontal Alignment Horizontal curve radius shall not be less than 200 feet at the centerline of roadway, except as otherwise shown on the Plans.

The minimum roadway width, that is the clear distance between rails or curbs, shall be as indicated in the Contract. The approach roadway shall have a minimum of 2 feet wide shoulders, to the roadway berms, where guardrail is not required, in addition to the minimum roadway width stated above. Roadway width as indicated in the Contract shall be the minimum clear travel width between faces of bridge curbs, bridge rails or approach rails, whichever is less. The approach roadway shall have 2 feet wide shoulders, minimum, to the roadway berms, where guardrail is not required, in addition to the roadway width indicated in the Contract.

The roadway width shall be increased on curved portions of the Special Detour to account for the off tracking characteristics of a WB-62 vehicle in accordance with the AASHTO publication "A Policy On Geometric Design of Highways and Streets", Chapter 3 tables entitled "Derived Traveled Way Widths for Turning Roadways for Different Design Vehicles" and "Design Widths of the Traveled Way for Turning Roadways."

b. Vertical Alignment Grades shall not exceed 10 percent and any change in grade shall accommodate all legal highway vehicle components or attached loads.

c. Approach Road Guardrail The Special Detour approaches shall have guardrail or concrete barrier where side slopes are steeper than 3 horizontal to 1 vertical, or as specified on the Plans. Approach guardrail shall be Type 3 guardrail or an approved equal and shall be attached to the bridge rail in a manner that develops the guardrail in tension. Approach barrier shall be attached to the bridge rail with a rigid connection with a similar strength capacity to the bridge rail. If the Plans specify a type of rail or barrier, that type shall be used.

The termination of approach guardrail or barrier and the end treatment of the rail shall be in accordance with the current AASHTO Roadside Design Guide.

d. Approach Embankments The earth material used for approach embankments shall have sufficient strength under the placement method specified in the Contractor's plans to maintain stability throughout the duration of the Special Detour.

e. Approach Road Base Drainage The approach road base structure shall consist of a 1 foot thick layer, minimum, of aggregate subbase course gravel, Type D or E. This layer shall be designed to support legal loads during the use of the detour. Drainage shall be designed to drain the approach area.

f. Approach Road Surface The approach road surface, including the shoulders, shall be paved with a 3 inch, minimum, thickness hot bituminous pavement layer, except when specified to be a gravel surface. When a gravel surface is specified, it shall consist of an approved gravel.

g. Design Speed The design speed of the Special Detour shall be not less than the construction area posted speed limit, or the advisory speed limit, as applicable, unless otherwise indicated in the Contract.

510.04 Pedestrian Traffic Only The provisions of Section 510.03 - Vehicular and Pedestrian Traffic Not Separated, shall apply to this Section with the following modifications:

- a. Structures shall be designed for a live load of ~~85-75~~ lb/ft² (unfactored).
- b. The Special Detour shall have a minimum clear width of 5 feet or as specified in the Contract.

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- c. Vertical alignment and ramps shall be ADA compliant.
- d. Deflections due to live load shall not exceed 1/300 of the span.

510.05 Vehicular and Pedestrian Traffic Separated The provisions of both Section 510.03 - Vehicular and Pedestrian Traffic Not Separated, and Section 510.04- Pedestrian Traffic Only, shall apply to this Section. If vehicles and pedestrians are carried on the same structure, each shall have its own lane as specified. The pedestrian lane shall be protected from vehicular traffic by being at least 9 inches above the roadway surface or suitably protected by means of an adequate curb at least 9 inches in height above the roadway surface. No bridge rail will be required between vehicle traffic and pedestrian traffic, unless otherwise specified, but shall be located at the exterior side of the ~~sidewalk~~pedestrian lane.

510.06 Special Detour Construction The Special Detour, including temporary structures and approaches, shall be constructed in accordance with the plans submitted by the Contractor. Barricades, warning signs, lights and other traffic control devices shall be provided in accordance with the Contract and the approved Traffic Control Plan.

The ~~temporary structure's~~ deck and floor members of the temporary structure shall be fastened or anchored so that all contact surfaces with adjacent supporting members bear continuously. If timber plank decking is used, it shall be secured into timber nailer strips with screw-type nails, or securely fastened by an alternate method that will prevent the decking from loosening. Immediate corrective action shall be taken by the Contractor to remedy any condition in the structure that results in objectionable or distractive noise levels, or results in the decking becoming loose, when subject to traffic loads.

Screw-type nails will not be required to anchor timber plank decking for pedestrian traffic use.

The approach road surface, including shoulders, whether paved or graveled, shall be maintained in a compacted and smooth condition. The temporary structure travel surface shall be constructed and maintained in an acceptably smooth condition, as determined by the Resident. Immediate corrective action shall be taken by the Contractor to remedy objectionable roughness of the Special Detour riding surface.

Provisions shall be made for a skid resistant wearing surface throughout the period of time the temporary structure is open to public travel for vehicular and pedestrian traffic. A steel grid floor may be used for vehicular traffic if installed in accordance with the design plans and these specifications.

Erosion control shall be accomplished in accordance with Section 656 - Temporary Soil Erosion and Water Pollution Control.

When the Project has been opened to traffic, the temporary structure and approaches shall be removed to, or below, the streambed, finish ground line or original ground line, as applicable. ~~The approaches shall be obliterated~~All approach materials shall be removed and

the disturbed areas shall be stabilized to original, or better than original, conditions. The provisions of Section 104 - General Rights and Responsibilities, shall apply.

510.07 Contractor's Responsibility The Contractor shall be responsible for removal of snow from areas provided for pedestrian traffic as well as vehicular traffic in accordance with Section 105, General Scope of Work. In addition to normal maintenance, should any part, or all, of the Special Detour be damaged or destroyed by high water, or any other cause, prior to, or after, opening the Special Detour to traffic, it shall be repaired or replaced by the Contractor without additional compensation.

510.08 Method of Measurement Special Detours will be paid by the lump sum.

510.09 Basis of Payment The accepted Special Detour will be paid for at the Contract lump sum price which price shall be full compensation for the respective items, as called for in the Contract, including design, construction, maintenance, complete removal, rehabilitation and permanent stabilization including loaming, seeding and mulching. All gravel or borrow material and excavation needed to accommodate changes in elevation between temporary structures and existing roadways shall be incidental to this item. All guardrail or concrete barrier required solely for the Special Detour shall be incidental to this item. The lump sum price shall also include the cost of furnishing and revising, as necessary, all plans, computations and certifications, as called for in the Contract. Payment will be made as follows: 60 percent of the lump sum price will be paid when the Special Detour is acceptable and open to traffic; another 20 percent of the lump sum price will be paid when the Special Detour is no longer needed and is closed to traffic; the final 20 percent of the lump sum price will be paid when the Special Detour is removed and the area encompassing the Special Detour is acceptably restored.

Traffic control devices, work zone crash cushions, temporary erosion control, pavement, and dust control will be paid for in accordance with the applicable Contract items.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
510.10 Special Detour, <u>foot Roadway</u>	<u>Lump Sum</u>
<u>Width</u> Vehicular and Pedestrian Traffic	<u>Lump Sum</u>
Not Separated	
510.11 Special Detour, Pedestrian Traffic Only	Lump Sum
510.12 Special Detour, <u>foot Roadway</u>	<u>Lump Sum</u>
<u>Width</u> Vehicular and Pedestrian Traffic	<u>Lump Sum</u>
Separated	

SECTION 523
BEARINGS

523.094 Final Adjustment Amend this section by adding the following to the end:

“Bearing sole plate to girder flange welds shall be performed in accordance with Standard Specification Section 504.55 Field Welding and Repairs.”

New Items

SECTION 524 - TEMPORARY STRUCTURAL SUPPORTS

524.01 Description This work shall consist of the designing, fabricating, erecting, maintaining, and dismantling of temporary structural support(s) as called for on the Contract Plans, all in conformity with these specifications. Temporary structural supports proposed by the Contractor to facilitate the work shall also conform to these specifications.

524.02 Materials Materials used may be either sawn timber or steel, or a combination of both, at the Contractor's option, and, whether new or used, shall be sound and of adequate cross section for the intended loads. Blocking needed below the temporary supports to accommodate differences in elevation, and/or pads required to distribute loads to the soil may additionally incorporate plain and reinforced concrete.

524.03 Design Temporary structural support(s) shall be designed to support all vertical loading including live load and impact, differential settlement forces, horizontal and longitudinal forces, and shall account for any temporary unbalanced loading due to jacking forces and other loading during load transfer. Sufficient redundancy shall be designed into the support structure so that failure of one member will not cause the collapse of the entire system and the supported structure.

Temporary supports which are adjacent to traveled ways or which support structures carrying traffic, shall additionally be designed to resist any vibration or impact forces due to traffic and shall incorporate sufficient protection against impact by errant vehicles.

Temporary support(s) shall be designed by a licensed Professional Engineer and all plans, computations, and working drawings shall be signed by that Engineer, and shall be submitted to the Resident for approval. The design of the Temporary Structural Support(s) shall be submitted to the Resident at least 3 weeks prior to the start of Work.

524.031 Protective Shield Design The provisions of Section 524.03 – Design shall apply to this Section with the following modifications:

The proposed methods of protective shielding, including connections and fasteners, shall be in accordance with the following criteria:

The protective shield shall be designed for safely supporting all construction and dead loads, but not less than 100 pounds per square foot with a load duration of 7 days. Protective shield shall be stiff enough to limit deflection to 1/2 inch under maximum loads and to be tightly sealed at all joints. The protective shield shall be placed on the tops of the bottom flanges of steel girders, with edges and laps made tight to protect the motorists underneath from dust, debris, water, slurry and falling objects.

The Protective shield shall be designed to safely support all anticipated loads from pieces of concrete falling from the existing deck during saw cutting or initial handling operations while the existing deck is being removed, and to protect against tools falling onto traffic below.

524.032 Approach Roadway Support Design The provisions of Section 524.03 – Design shall apply to this Section with the following modifications:

The temporary structure and approaches shall achieve acceptable minimum factors of safety. Minimum factors of safety for slope stability are 1.3 for approach embankment slopes and 1.5 for embankment slopes that contain or support structures. The minimum factor of safety for sliding and overturning is 1.3.

524.04 Erection and Removal The erection of temporary support(s) shall be in strict conformance with the approved design and details and shall use only the materials approved for use. No loads shall be placed on the temporary support(s) until the Contractor's Professional Engineer has provided written certification to the Resident that the system was erected in conformance with the approved plans and design details.

The consent of the Department regarding design, construction or use of temporary supports shall not be construed, in any way, as relieving the Contractor of its responsibility to provide supports that are adequately designed and constructed to carry the loads that will be placed upon them. The work shall be entirely at the Contractor's risk.

Upon completing the work requiring the use of the temporary structural supports, the temporary support structures shall be removed and the area under and around them shall be restored to its original condition.

524.041 Protective Shield Erection and Removal The provisions of Section 524.04 – Erection and Removal shall apply to this Section with the following modifications:

No portion of the protective shield installed over a roadway shall project below a horizontal plane projecting out at the lowest point of the superstructure. During demolition operations and constructing/placing the new deck, the protective shield shall be covered with sheet plastic made tight at edges and laps to prevent water used in the saw cutting operation or placement of concrete from falling onto the facilities under the bridge.

The protective shield on existing and new structures shall extend horizontally a minimum of 3 feet beyond the fascia lines and vertically to a point 1 foot minimum above the top of rail or parapet. Shielding shall extend 10 feet beyond the edge of pavement on the roadway below or as approved by the Resident.

Shielding shall be approved and installed prior to the start of any demolition work and shall remain in position during all demolition work. Shielding shall also be approved and installed prior to the start of any deck forming for the new bridge and shall remain in position during all deck work. The protective shielding shall be relocated or removed only as directed by the Resident.

524.05 Method of Measurement Temporary structural supports will be measured as the number of individual units called for on the Plans, satisfactorily designed, erected,

maintained, and dismantled. Temporary Structural Support, Approaches and Temporary Structural Support, Protective Shield shall be measured as one lump sum satisfactorily designed, erected, maintained, and dismantled.

Temporary supports used by the Contractor for their convenience will not be measured for payment. Installation and reinstallation of Temporary Structural Supports between construction phases, if required, will not be measured separately, but will be considered incidental to the Temporary Structural Support Pay Item.

Any work associated with support, bracing, or otherwise stabilizing any structures disturbed or partially removed as part of the Work or with removal and reinstallation of existing highway appurtenances (e.g. guardrails, sign supports, etc.) to facilitate the erection of Temporary Structural Supports will not be measured for payment, but will be considered incidental to the Temporary Structural Support Pay Item.

524.06 Basis of Payment Temporary Structural Supports will be paid for at the contract unit price, which price shall be full compensation for all materials, equipment, labor and incidentals necessary for the design, erection, maintenance, and dismantling of such supports in accordance with the Plans and these Specifications or as approved by the Resident. This work includes but is not necessarily limited to: Working Drawings; design; transportation and stacking; installation; removal, onsite storage, and reinstallation as required; and periodic removal of concrete rubble and other materials necessary to perform the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
524.30 Temporary Structural Support	Each
→ 524.301 Temporary Structural Support, Approaches	Lump Sum
→ 524.40 Temporary Structural Support, Protective Shield	Lump Sum

New
Items

New Section

SECTION 530 - GLASS FIBER REINFORCED POLYMER REINFORCEMENT BARS

530.01 Description This work shall consist of furnishing and placing Glass Fiber Reinforced Polymer (GFRP) reinforcement bars, in accordance with the Plans and as specified herein.

530.02 Materials GFRP reinforcement shall meet the requirements shown in the AASHTO LRFD Bridge Design Guide Specifications for GFRP-Reinforced Concrete, including interim revisions, except as shown on the Plans and as stated herein. All GFRP reinforcement shall be deformed or sand coated.

GFRP reinforcement bars shall be one of the approved products listed on the MaineDOT Qualified Products List.

All GFRP reinforcement in the same structural component shall be supplied by the same manufacturer; there shall be no mixing of products from different manufacturers in a component unless permitted in the Contract Documents.

530.021 Documentation The GFRP reinforcement manufacturer shall submit two copies of a Material Certification stating that the GFRP reinforcement incorporated into the Project meets the requirements of this specification to the Resident. The certification shall include the test values and test procedures used to determine the physical properties of the GFRP reinforcement. The certification shall bear the notarized signature of a responsible authorized representative of the GFRP reinforcement manufacturer. Each bundle of GFRP reinforcement shall be identified with the lot number affixed to each bundle by means of a durable tag.

530.03 Schedule of Material When the Plans do not include GFRP reinforcement bar schedules, the Contractor shall submit order lists, shape diagrams and bar layout drawings in accordance with Subsection 105.7 to the Resident for approval. The GFRP reinforcement shall not be ordered until these lists and drawings are approved. Approval shall not relieve the Contractor of full responsibility for the satisfactory completion of the Work specified herein. When the Department allows the use of precast concrete deck panels, or any other significant changes that affect the quantity of GFRP reinforcement, the Contractor shall be responsible for revising the reinforcement bar schedule; the revised schedule shall be submitted to the Resident for approval. Substitution of different size GFRP reinforcement will not be permitted except with the written authorization of the Engineer of Record.

530.04 Fabrication Forming and fabrication tolerances of GFRP reinforcement shall be in conformance with the latest edition of the "Manual of Standard Practice of the Concrete Reinforcing Steel Institute" and the "Detailing Manual of the American Concrete Institute."

530.05 Protection of Material Delivery, storage, and handling of GFRP reinforcement shall be in accordance with the manufacturer's recommendations. The Contractor shall prevent bending, coating the bars with soil, oil, or other material, or other damage to the GFRP reinforcement.

All handling of GFRP reinforcement by mechanical means shall be done by equipment having padded contact areas, or using nylon webbing slings. The use of chains or wire rope slings will not

be allowed, even when used with padding. All bundles of GFRP reinforcement shall be lifted with a strong back, spreader bar, multiple supports, or a platform bridge to prevent bar-to-bar abrasion from sags in the bundles. Support points during lifting or transporting of bundled GFRP reinforcement shall be spaced at a maximum of 15 feet, or as required by the manufacturer, whichever is more restrictive. Bundled bars shall be strapped together with non-metallic or padded straps in a manner to prevent bar-to-bar abrasion due to relative movement between bars.

Individual bars shall be handled in a manner that prevents damage to the coating due to abrasion or impact, and at no time shall any bar be moved by dragging over any surface, including other reinforcement bars. Sufficient personnel shall be assigned to ensure compliance with the provisions above.

Bars loaded for transport shall be loaded and strapped down in a manner that will prevent damage from motion and vibration, to the greatest extent possible. Bundles of bent bars shall be transported strapped to wooden platforms or shall be crated. All individual bundles and layers of bundles shall be separated, and supported by dunnage.

GFRP reinforcement shall be stored on skids or other supports a minimum of 12 inches above the ground surface and protected at all times from damage and surface contamination. The storage supports shall be constructed of wood or other material that will not damage the surface of the GFRP reinforcement or sand coating. Bundles of bars shall be stored on supports in a single layer. Each bundle shall be placed on the supports out of contact with adjacent bundles. If it is expected that GFRP bars will be required to be stored outdoors for a period in excess of two months, then the GFRP reinforcement shall be protected from ultraviolet radiation. Prevent exposure of GFRP to temperatures above 120 degrees Fahrenheit.

All damaged bars shall be repaired in accordance with manufacturer recommendations and inspected and accepted by the Resident prior to placing concrete. All bars with total damage greater than 2 percent of the bar surface area, including previously repaired areas, will be rejected. All cuts, scratches, cracks, abrasions, or other damage, visible to the naked eye, shall be repaired. All bars damaged prior to placement within the formwork shall be repaired prior to GFRP reinforcement placement.

530.06 Placing and Fastening GFRP reinforcement shall be accurately placed in the positions shown on the Plans. Support and firmly tie or otherwise secure GFRP reinforcement in place to prevent settlement, floating upward, or movement in any direction during the placing and setting of the concrete.

Field bending of GFRP reinforcement is not allowed.

Field cutting of GFRP reinforcement will only be permitted with the approval of the Resident. Field cutting shall be with a high-speed cutter, fine blade saw, diamond blade or masonry saw. The GFRP reinforcement shall not be shear cut. The ends of all field cut GFRP reinforcement shall be treated in accordance with the manufacturer's recommendations.

GFRP reinforcement supported on formwork shall rest on stays, blocks, ties, hangers, GFRP or plastic chairs, bar supports made of dielectric material, or other approved materials. Blocks used for this purpose shall be precast Portland cement mortar blocks of approved shape and dimensions. Blocks shall not be used in cases where the blocks will be visible in the finished product. Reinforcement bars used as support bars shall be GFRP, stainless steel, or non-metallic. The use of pebbles, stone, brick, metal pipe, wood, or metal chairs will not be allowed. Wire bar supports will not be allowed. Layers of bars may be separated by precast Portland cement mortar blocks or other approved devices.

Bars shall be fastened together at all intersections except where spacing is less than 1 foot in either direction, in which case, fastening at alternate intersections of each bar with other bars will be permitted providing this will hold all the bars securely in position. Ties shall be soft annealed wire that has been nylon, epoxy or plastic coated. Plastic ties will also be allowed. Placing reinforcement as concrete placement progresses, without definite and secure means of holding the GFRP reinforcement in its correct position, will not be allowed.

When specified on the Plans, GFRP reinforcement shall be anchored into drilled holes. The anchoring material shall be one of the products listed on the Maine Department of Transportation's Qualified Products List and the Contractor shall submit a selected material to the Resident for approval. Installation shall be in accordance with the manufacturer's recommendations.

At each anchor location, existing reinforcement shall be located to avoid drilling through existing bars. Where interferences exist, location adjustments will be determined by the Resident. Minimum embedment lengths of reinforcement shall comply with the manufacturer's recommendations for the anchoring material selected. The embedment lengths will be verified by the Resident before installation of the reinforcement.

Termination of GFRP reinforcement shall be as shown on the Plans. Any exceptions or modifications shall be approved, in writing, by the Engineer of Record.

Immediately before placing concrete, GFRP reinforcement shall be free from all foreign material. Foreign material includes, but is not limited to, dirt, paint, oil, bitumen and dried concrete mortar. Reinforcement shall be inspected and approved by the Resident prior to concrete placement.

530.07 Splicing GFRP Reinforcement shall be spliced as shown on the Plans and as specified herein. No modifications of, or additions to, the splice arrangements shown on the Plans will be allowed without the prior approval of the Resident.

Any additional splices authorized shall be staggered as much as possible. All splices shall be made in a manner that will ensure that not less than 75% of the clear concrete cover and not less than 75% of the minimum clear distance to other reinforcement will be maintained, as compared to the cover and clear distance requirements for the un-spliced reinforcement.

Lapped splices shall be made by placing the bars in contact and tying them together. Ties shall meet the requirements specified herein.

530.08 Method of Measurement GFRP reinforcement will be measured by the linear foot based on the authorized quantity in the Contract or in the approved reinforcement bar schedule submitted by the Contractor. No adjustments to the quantity will be made except to account for changes at the direction of the Resident.

If precast concrete deck panels are used, GFRP reinforcement in precast concrete deck panels will be considered incidental to the deck concrete. No separate payment will be made.

Lap splices that are authorized at the Contractor's request will not be measured for payment.

530.09 Basis of Payment Payment for Glass Fiber Reinforced Polymer, Fabricated and Delivered, shall be considered full compensation for detailing, furnishing, and proper storage of GFRP reinforcement.

Payment for Glass Fiber Reinforced Polymer, Placing, shall be full compensation for installation, adjustment, and supplies related to placing GFRP reinforcement.

Payment for work associated with furnishing and revising the GFRP reinforcement bar schedule, and all expenses incurred by the Contractor and their suppliers to fulfill the requirements specified will be considered incidental to related Contract items. No separate payment will be made.

Payment will not be made for any materials used to hold reinforcement in place or for extra GFRP reinforcement due to substitutions and splices made for the Contractor's convenience.

When GFRP is specified to be anchored into drilled holes, no additional payment will be made for drilling and anchoring GFRP reinforcement or cutting GFRP reinforcement.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
530.30 GFRP, Reinforcement Bars, Fabricated & Delivered	Linear Foot
530.31 GFRP, Reinforcement Bars, Placing	Linear Foot

Meservier, Patrick P

From: Macdougall, George
Sent: Wednesday, October 15, 2025 3:04 PM
To: Furber, Melanie G
Subject: FW: Latest Repair Spec 5-19-25 Change

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George M.A. Macdougall P.E. | Contracts and Specifications Engineer
Maine Department of Transportation
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"Don't judge each day by the harvest that you reap, but by the seeds that you plant." Robert Louis Stevenson

From: Shepherd, Eric <Eric.Shepherd@maine.gov>
Sent: Tuesday, June 17, 2025 2:33 PM
To: Macdougall, George <George.Macdougall@maine.gov>
Subject: Latest Repair Spec 5-19-25 Change

George,

I noticed something minor in the current Repair Spec that can be deleted. Under Section 526, Concrete Barrier, under 526.02, Materials, the last sentence of 526.02, under g., Device Crashworthiness, can probably be deleted, as it's discussing something that was allowed in the past- see below in red.

g. Device Crashworthiness MaineDOT is transitioning to MASH2016 criteria for Portable Concrete Barrier on the following schedule:

New Portable Concrete Barrier shall be crash tested and/or evaluated to MASH2016 criteria.

Current Portable Concrete Barrier in useful serviceable condition that is successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2029.

Other current Portable Concrete Barrier that is deemed acceptable by the Department may be utilized on projects off the National Highway System through December 31, 2024.

No rush on this.

Thanks,

Removed

Meservier, Patrick P

From: Macdougall, George
Sent: Tuesday, November 4, 2025 9:00 AM
To: Furber, Melanie G
Subject: Fw: Sealing Bit, Curb

Follow Up Flag: Follow up
Flag Status: Completed

From: Shepherd, Eric <Eric.Shepherd@maine.gov>
Sent: Tuesday, November 4, 2025 8:18:52 AM
To: Macdougall, George <George.Macdougall@maine.gov>
Cc: Bickford, Scott <Scott.Bickford@maine.gov>
Subject: FW: Sealing Bit, Curb

George,

Based on the below emails, the following sentence needs to be deleted from Standard Specification Section 609.04, Bituminous Curb, item "c" (this is in the current Repair Spec):

"Curb designated to be painted shall not be sealed with bituminous sealing compound."

↑ Remove

Thank you,
Eric

From: Bickford, Scott <Scott.Bickford@maine.gov>
Sent: Tuesday, November 4, 2025 8:14 AM
To: Shepherd, Eric <Eric.Shepherd@maine.gov>; Mettey, Catherine <Catherine.Mettey@maine.gov>
Cc: Anderson, Devin <Devin.Anderson@maine.gov>
Subject: RE: Sealing Bit, Curb

Correct

Echoes of the past

From: Shepherd, Eric <Eric.Shepherd@maine.gov>
Sent: Tuesday, November 4, 2025 8:05 AM
To: Bickford, Scott <Scott.Bickford@maine.gov>; Mettey, Catherine <Catherine.Mettey@maine.gov>
Cc: Anderson, Devin <Devin.Anderson@maine.gov>
Subject: RE: Sealing Bit, Curb

Thanks, Scott. So, it looks like the following sentence (which is also in the current Repair Spec) should be deleted: "Curb designated to be painted shall not be sealed with bituminous sealing compound." Correct?

two new Pay Items
added,
607.182
607.183

SECTION 607 - FENCES

607.01 Description Construct fence and gates.

607.02 Materials Materials shall meet the requirements specified in the following Sections of Division 700 – Materials unless otherwise specified herein:

Barbed Wire	710.01
Woven Wire	710.02
Chain Link Fabric	710.03
Cedar Rail Fence	710.05
Fence Posts and Braces	710.06

Bars for barways shall be of eastern hemlock, northern white pine, Norway pine, spruce, cedar, or tamarack, equal in quality to the wood posts. The bark shall be removed and all knots hewn flush.

Metal gates shall be of galvanized steel.

Staples shall be of galvanized or aluminum coated steel.

Concrete for anchoring metal posts, metal braces and wooden gate posts shall meet the requirements of Section 502 - Structural Concrete, except air entraining will not be required. The class of concrete shall be optional.

Drive anchors shall be an approved anchorage consisting of two steel angles driven diagonally into the ground through metal clamps bolted to the post. All parts shall be galvanized.

607.03 General The Contractor shall perform clearing and grubbing necessary to construct the fence to the required grade and alignment.

Posts shall be spaced as called for on the plans except that a variation of 2 feet back or ahead on line may be allowed at approved locations. The tops of posts shall be set to the required grade and alignment. Cutting off the posts may be allowed with approval.

Posts for cedar rail fence shall be set plumb in drilled or hand dug holes. After posts are placed, rails installed and the posts aligned, the post holes shall be backfilled. The completed fence shall have the tops of the posts at uniform height above ground following the gradient of the ground.

Posts for woven wire fence and barbed wire fence shall be braced with Type I or Type II bracing at designated location as hereafter specified. Type I bracing shall include diagonal brace and one post of the designated size. Type II bracing shall include two diagonal braces and one post of the designated size.

When the plans require posts or braces to be anchored into the soil, concrete anchors or metal drive anchors shall be used. If concrete is used, temporary guys to hold the posts in position shall be installed until the concrete has set. Unless otherwise permitted, no material shall be installed on posts or strain placed on guys and bracing set in concrete until 48 hours after the concrete has been placed.

If metal drive anchors are used they shall be installed according to the manufacturer's instructions so all parts will be below the ground surface. One drive anchor shall be used on line posts; two drive anchors shall be used on bracing assemblies. Where two drive anchors are used, they shall be placed perpendicular to each other.

Backfill with earth placed in 8 inch layers, loose measure, and each layer thoroughly tamped.

Metal posts to be set in solid rock shall be placed in drilled holes and grouted with a cement grout composed of 1 part Portland cement and two parts sand mixed with water.

All surplus material and other debris shall be removed and disposed of.

607.04 Woven Wire or Barbed Wire Fencing Wood posts shall be set plumb in holes dug to full depth. Metal posts shall be set plumb by an approved post driver. Posts, which are bent or otherwise damaged, shall be removed and replaced.

a. Bracing At changes in horizontal alignment in excess of 30°, bracing will be required. At changes in horizontal alignment of 15° to 30°, bracing may be called for on the plans or required by the Resident. At changes in horizontal alignment angles of less than 15°, bracing will not be required except at intervals of 660 feet.

In depressions where tension in the fencing may cause lifting, the post will require bracing.

End, corner, gate, barway, and intermediate posts shall be braced and anchored as shown in the Standard Details.

If metal posts are to be placed in concrete, the concrete shall be allowed to set before the space around the base is backfilled. Backfill with satisfactory material thoroughly tamped. If directed, the Contractor shall place a minimum of 6 inches of gravel in the bottom of the post hole.

b. Gates All gates and the bracing assemblies at gates shall be constructed of metal.

c. Barways Barways shall be constructed of posts corresponding to the type of fence posts used. Wood crossbars shall be furnished.

d. Erection of Fabric or Wire Fabric or wire shall be stretched taut. Each strand of barbed wire shall be attached to wood posts with staples. Top and bottom strands of woven

wire shall be attached to each post and alternate interior strands of woven wire fencing shall be attached to alternate posts. Staples shall not be driven into line posts to restrict the horizontal movement of wire except at corner posts, end posts and bracing where staples shall be fully driven. When attaching fencing to metal posts, approved stay fasteners shall be used.

Except as otherwise provided, splicing wire will be permitted at posts only with each horizontal strand of wire wrapped completely around the post. The wire strand shall be fastened by winding the wire about the same strand where it leads to the post. This type of fastening shall be used at each end post, corner post, and gate post and at barway posts. Other devices designed specifically to splice fencing wire may be used, subject to approval.

607.05 Chain Link Fence, Ground Installed Foundations for posts for chain link fence shall be cast-in-place Portland cement concrete placed in approved forms or shall be approved metal drive anchors. If wood forms are used, they shall be removed before backfilling. If fiber forms are used, they need not be removed.

a. Braces Fences less than 6 feet in height that are installed with a top rail shall not require any brace rails. Fences less than 6 feet in height installed without a top rail and all fences with heights of 6 feet or more shall have brace rails installed midway between the top and bottom of the fabric as shown on the plans. Braces shall be securely fastened to the posts then trussed from the line post to the base of the end, intermediate or corner post with a $\frac{3}{8}$ inch diameter truss rod and tightened. At changes in horizontal alignment of less than 15°, bracing will not be required except at intervals of 330 feet. At changes in alignment of 15° to 30°, bracing may be required as called for on the plans or requested. At changes in alignment in excess of 30°, bracing will be required. One brace assembly shall be furnished with each end or gate post and two assemblies with each corner or intermediate post and at grade changes specified above.

b. Gates Where gates are required for chain link fence, they shall be constructed of metal.

c. Erection of Chain Link Fabric The grade of fence shall be approximately parallel with the grade of the ground. When directed, abrupt depressions shall be filled.

Top rails when required, shall pass through post caps and be securely fastened to end, corner, brace and gate posts. Joints in top rails shall be made with expansion sleeve couplings. On curves with a radius of less than 500 feet, the top rail shall be bent to the arc.

The fabric shall be pulled taut, the ends attached to the posts with stretcher bars, and bands or other approved devices. When required, wire fabric shall be joined by weaving a single strand of mesh wire into the ends of the rolls to form a continuous mesh.

d. Tension Wire When called for on the plans, a tension wire of seven gage galvanized wire shall be used in place of the top rail.

607.06 Chain Link Fence, Barrier Mounted Barrier mounted fences, such as bridge snow fence or railroad security fence on a bridge or wall shall be constructed according to the details in the Plans (including the Standard Details) and meet the following material and installation requirements.

a. Posts and Rails Posts, rails, and braces shall be manufactured by one of the following methods with the steel conforming to ASTM A1011 or ASTM A1008 and A1011/A1011M:

- Furnace butt welded, continuous welded
- Cold rolled and electric resistance welded
- Seamless

Top rails shall pass through post caps and be securely fastened to end posts. Joints in top rails shall be made with expansion sleeve couplings. On curves with a radius of less than 500 feet, the top rail shall be bent to the arc.

b. Attachments Tension bars, bar bands, and rail clamps shall be steel or aluminum alloy conforming to AASHTO M 181 (ASTM F626). Steel components shall be hot-dip galvanized in accordance with AASHTO M 111 (ASTM A123), AASHTO M 232 (ASTM A153), or ASTM B695, Class 50, Type I as applicable.

c. Hardware All bolts and nuts shall be steel conforming to ASTM A307 and ASTM A563 Grade A respectively. Washers shall be hardened steel commercial Type A plain and shall meet the dimensional requirements of ANSI B18.22. All bolts, nuts, and washers shall be hot-dip galvanized in accordance with AASHTO M 111 (ASTM A123), AASHTO M 232 (ASTM A153), or ASTM B695, Class 50, Type I as applicable.

d. Chain Link Fabric The chain link fabric shall be 9-gauge steel, zinc coated conforming to AASHTO M 181 Type 1 Class D (ASTM A 392), aluminum-coated conforming to AASHTO M181 Type II (ASTM A 491), or 6-gauge aluminum alloy conforming to AASHTO M 181 Type III (ASTM F1183). Chain-link fabric shall be knuckled on top and bottom.

The fabric shall be pulled taut when installed. When required, wire fabric shall be joined by weaving a single strand of mesh wire into the ends of the rolls to form a continuous mesh.

e. Wire Ties Wire ties shall be standard round 9-gauge zinc or aluminum coated steel or 6-gauge aluminum alloy conforming to ASTM F 626. All ties shall be wrapped around chain-link fabric twice (double-pigtailed) at both ends. Space ties at 6" on center to bottom rail and at 12" on center at all posts and other rails. Mechanical or power fastened ties are acceptable.

607.07 Method of Measurement Fence will be measured by the linear foot accepted in place. Measurement will be along the gradient of the fence from outside to outside of end posts for each continuous run of fence and shall include fence at bracing assemblies but shall not include space at gates and barways. Gates, barways, and bracing assemblies will be

measured by the unit of the size and type specified. Excavation in rock for placement of fence posts in drilled holes will be measured by the cubic yard determined from the actual depth of the drilled hole in the rock and a hypothetical circle diameter of 2 feet.

Barrier mounted fences shall be measured by the lump sum accepted in place.

607.08 Basis of Payment The accepted quantities of fence will be paid for at the contract unit price per linear foot of the type and size specified complete in place. Barways, gates, and bracing assemblies will be paid for at the contract unit price for each type specified complete in place. Payment shall be full compensation for furnishing, assembling, and installing all materials, for excavating and backfilling holes, and for all incidentals necessary to complete the work except that in rock, payment for drilled holes will be made under 109.7.5 – Force Account. Excavation of earth to exposed rock shall be incidental to the several items for erection of the fence.

Payment for bracing assemblies shall include furnishing and installing the various larger size and longer length posts, diagonal bracing, ties, anchors and all incidental hardware necessary to complete the type of assembly required, all as shown in the Standard Details. At gateways, payment will be made for bracing assemblies and there will be no separate payment for the gate posts. All extra costs incurred for furnishing and installing the oversize posts at gateways shall be considered included with the various contract items.

Clearing or removal of trees, stumps or boulders, required to install the fence shall be included in the work of the respective pay items of this section.

The accepted quantities of barrier mounted fence will be paid for at the Contract lump sum price complete in place. Payment shall be full compensation for furnishing, assembling, and installing all materials, including components like anti-climb shields.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
607.08 Woven Wire Fence – Wood Posts	Linear Foot
607.09 Woven Wire Fence – Metal Posts	Linear Foot
607.10 Barbed Wire Fence – Wood Posts	Linear Foot
607.11 Barbed Wire Fence – Metal Posts	Linear Foot
607.12 Barway - Wood Posts	Each
607.13 Barway - Wood Posts	Each
607.14 Walk Gateway 4 foot – Metal	Each
607.15 Drive Gateway 16 foot – Metal	Each
607.16 Chain Link Fence – 4 foot	Linear Foot
607.163 Chain Link Fence – 4 foot – PVC Coated	Linear Foot
607.165 Chain Link Fence – 4 foot – without Top Rail	Linear Foot
607.17 Chain Link Fence – 6 foot	Linear Foot
607.173 Chain Link Fence – 6 foot – PVC Coated	Linear Foot

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New
Items

→	607.175	Chain Link Fence – 6 foot – without Top Rail	Linear Foot
→	607.182	Chain Link Fence – 8', High Security	Lump Sum
	607.183	Chain Link Snow Fence 33"	Lump Sum
	607.22	Cedar Rail Fence	Linear Foot
	607.23	Chain Link Fence Gate	Each
	607.24	Remove and Reset Fence	Linear Foot
	607.25	Remove and Reset Chain Link Fence	Linear Foot
	607.30	Bracing Assembly Type I – Wood Posts	Each
	607.31	Bracing Assembly Type II – Wood Posts	Each
	607.32	Bracing Assembly Type I – Metal Posts	Each
	607.33	Bracing Assembly Type II – Metal Posts	Each
	607.34	Bracing Assembly Chain Link Fence	Each
	607.35	Bracing Assembly Chain Link Fence – PVC Coated	Each

SECTION 627 - PAVEMENT MARKINGS

627.01 Description This work shall consist of furnishing and placing reflectorized pavement lines and markings, removing pavement lines and markings, and furnishing and applying reflectorized paint to curb~~ing~~ in reasonably close conformity with the ~~P~~plans and as designated.

627.02 Materials Materials shall conform to the requirements specified in the following Sections of Division 700 - Materials. The pavement marking material used shall be from the Department's QPL and ~~shall~~ have been tested through the National Transportation Product Evaluation Program (NTPEP).

Pavement Marking Paint	708.03
Reflectorized Plastic Pavement Marking	712.05

—Temporary Bi-directional Yellow Delineators shall be Temporary Object Markers (T.O.M.) as manufactured by the Davidson Plastic Company, 18726 East Valley Highway, Kent, WA 98031 or an approved equal.

When pavement marking paint must be applied on pavement with an air temperature between 35 °F and 50 °F, a low temperature waterborne paint may be used upon the Department's approval, as noted below. The Contractor shall submit the following information for Department review and approval at least 10 calendar days prior to application: The manufacturer and product name of the low temperature waterborne paint; the manufacturer's technical product data sheets; the product's SDS sheets; all required and recommended application specifications for the product; the manufacturer's requirements for temperature, surface preparation, paint thickness and the bead application shall be followed. No additional payment will be made for the use of low temperature waterborne paint.

Commented [MF1]: Already updated via 12/17/24 repair sp

627.04 General All pavement lines and markings shall be applied in accordance with the latest edition of the Manual on Uniform Traffic Control Devices.

—Longitudinal lines placed on tangent roadway segments shall be straight and true. Longitudinal lines placed on curves shall be continuous, smoothly curved, lines consistent with the roadway alignment. All pavement markings placed shall meet the tolerance limits included in the Contract Documents. shown on the plans.

—Unless otherwise shown on the ~~P~~plans, non-interstate lines shall be 4 inches wide and broken lines shall consist of alternate 10 foot painted line segments and 30 foot gaps. On controlled access divided highways and on the interstate system, lines shall be 6 inches

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wide and broken lines shall consist of alternate 15 foot painted line segments and 25 foot gaps. Width tolerance shall be +/- ~~one-quarter~~ $\frac{1}{4}$ inch.

— Temporary pavement marking lines, ~~defined in Special Provision Section 652, Maintenance of Traffic, Temporary Centerline,~~ will be applied as many times as necessary to properly delineate traffic lanes for the safe passage of traffic. Bi-directional delineators may be used in place of temporary lines, ~~if allowed by the Resident, except where specified otherwise in Special Provision 652 Maintenance of Traffic, Temporary Centerline.~~ Delineators will be applied at 40 foot intervals.

In overnight lane closure areas that are not to be overlaid, temporary plastic lines or ~~temporary bi-directional delineators raised pavement markers~~ shall be used through the length of the taper.

— Newly painted lines, markings and curb shall be protected from traffic ~~by the use of~~ cones, ~~drums, lane closures stationary vehicles~~ or other approved methods until the paint is dry.

— 627.05 Preparation of Surface Immediately before applying the pavement marking paint to the pavement or curb, the surface shall be dry and entirely free from dirt, grease, oil, or other foreign matter.

— Surface preparation for application of plastic markings shall conform to the manufacturer's recommendations.

627.06 Application Prior to applying paint for final pavement lines, the Contractor shall perform a test for paint thickness by furnishing and placing a piece of smooth, clean metal with an area of at least 144 ~~square inches~~ in^2 in the path of the striping truck. The striping truck shall be passed over the piece of metal, painting the surface as it passes, without applying beads. The result of this test will be used to determine the pressure setting and speed of the truck when applying paint to obtain the specified thickness. Additional paint thickness testing may be required on the final paint markings. The wet thickness of paint without beads on final pavement lines shall be a minimum of 16 mils.

— ~~On other final pavement markings and on curb, where the paint is applied by hand painting or spraying, application shall be one uniform covering coat with a thickness of at least 16 mils. Before the paint has dried, the glass beads shall be applied by a pressure system that will force the glass beads onto the undried paint as uniformly as possible. Painted lines and markings shall be applied in accordance with the manufacturer's published recommendations. These recommendations will be supplied to the Resident prior to installation. On other final pavement markings and on curb, where the paint is applied by hand painting or spraying, application shall be in two uniform covering coats, each at least 10 mils thick. Before the second coat of paint has dried, the glass beads shall be applied by a pressure system that will force the glass beads onto the undried paint as uniformly as possible.~~

Commented [MF2]: Already in per 12/17/24

Glass beads shall be applied to the final and temporary pavement lines, markings and curb at a sufficient rate and in sufficient quantity to assure complete and uniform coverage of hand painted surfaces and achieve proper reflectivity.

Permanent and temporary white lines and markings shall have a minimum final reflectivity value of 250 millicandelas per square meter per lux (mcd/m²/lux) and permanent and temporary yellow lines and markings shall have a minimum final reflectivity value of 150 millicandelas per square meter per lux (mcd/m²/lux), as measured by the Department. Measurements taken to determine reflectivity shall be done within 4 weeks after final placement.

The final reflectivity will be acceptable if 90 percent or more of the painted pavement lines and markings meet the specified minimum value. If less than 90 percent of the painted pavement lines and markings meet the specified minimum final reflectivity values, the Contractor shall repaint those areas not meeting required reflectivity at no cost to the Department. If, after repainting, analysis of the final reflectivity values results in the need for a second repainting, the Contractor will submit, in writing, a plan of action to meet the reflectivity minimums prior to continuing any work. Once the plan has been reviewed and approved by the Department, the Contractor shall carry out the plan reapply at no cost to the Department. If the final reflectivity values are less than the described minimums, the Contractor shall repaint those areas not meeting required reflectivity at no cost to the Department. If the final reflectivity values are less than the described minimums after the second attempt, the Contractor will submit in writing a plan of action to meet the reflectivity minimums prior to continuing any work. Once the plan has been reviewed and approved by the Department, the Contractor shall re-apply at no cost to the Department.

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~~Temporary painted lines and markings shall be applied as specified for permanent painted lines, except that the thickness shall be a minimum of 16 mils.~~

~~Temporary pliant polymer marking material shall be used for temporary markings on the final pavement and on pavements not to be resurfaced when such pavement markings do not conform to the final pavement markings pattern.~~

~~The plastic final pavement lines and markings shall be applied in accordance with the manufacturer's recommendations by the inlay method of application.~~

~~627.07 Establishment Period~~ Inlaid plastic pavement lines and marking material furnished and installed under this ~~C~~contract for final pavement markings shall still be subject to a six-month period of establishment.

~~The period of establishment shall commence as soon as the plastic pavement lines and markings are complete and in place and shall continue for six months. At the end of the establishment period, a minimum of 95 percent% of the plastic pavement lines and markings shall be remaining, still be in place to be acceptable.~~

—If less than 95 ~~percent~~% of the plastic pavement lines and markings are in place after six months, the Contractor shall replace all unsatisfactory plastic pavement lines and markings on the project without additional payment. Plastic pavement lines and markings designated for replacement shall be installed according to these specifications, unless otherwise directed. Plastic pavement lines and markings replaced at the end of the ~~six-months~~six-month establishment period will not be subject to a further establishment period.

—627.08 Removing Lines and Markings When it is necessary to remove pavement lines and markings, it shall be done by high pressure water, grinding or other approved acceptable means. The method chosen must be capable of completely eradicating the existing line or marking without excessive damage to the pavement. Burning ~~or using and the use of~~ solvents to remove temporary markings from final pavement, or from existing pavement not to be resurfaced, will not be permitted.

—627.09 Method of Measurement ~~For~~ The quantity of pavement marking lines identified in the ~~C~~econtract as a plan quantity pay item, the measurement ~~for of~~ payment will be the number of feet shown in the Schedule of Items. This quantity will be considered ~~final~~final, and no adjustments will be made except when changes resulting in increases or decreases are made by the Resident.

The ~~accepted~~ quantity of temporary or permanent pavement marking lines when identified in the ~~C~~econtract as ~~being paid for by the a~~ linear foot ~~item~~ shall be measured ~~by and paid for at the contract unit price per linear foot for the~~ actual length of painted line, as further described, below, total amount applied and accepted.

Double yellow centerline, broken or solid, will be considered one line for measurement purposes. The measurement of broken lines will include the gaps when painted and will not include the gaps when plastic. Double Yellow Centerline, broken or solid, shall not be ~~applied paid~~ through intersections or side roads and will be ~~measured by paid for~~ the actual length of painted line.

Broken white lines will include the gaps when painted and will not include the gaps when plastic inlaid pavement lines are applied. Yellow or white solid edge lines ~~shall and will not be~~ applied paid through intersections or side roads and will be measured by the actual length of painted line.

Temporary pavement marking lines shall not be ~~applied paid~~ through intersections or side roads and will be measured ~~by the per linear foot of~~ actual length of painted ~~line, and accepted.~~

—Reflectorized curb will be measured or computed by the square foot of curb surface actually painted and reflectorized.

The accepted quantity of removing existing pavement markings will be measured by the square foot.

—Temporary Bi-directional Yellow Delineators will be measured by each unit, ~~complete in place, maintained, and accepted.~~

—627.10 Basis of Payment The accepted quantity of pavement marking lines identified in the Contract as a plan quantity pay item will be paid for at the Contract unit price for plan quantity. No adjustment will be made to the quantity for payment, except as described in Section 627.09, Method of Measurement.

The accepted quantity of permanent or temporary pavement marking lines identified in the Contract as being paid for by the linear foot will be measured for payment as described under Section 627.09, Method of Measurement.

The accepted quantity of re-stripping of temporary pavement marking lines will be measured as described under Section 627.06, Method of Measurement, and will be paid for by the linear foot. The frequency of re-stripping of temporary pavement marking lines will be as authorized by the Resident.

All other permanent pavement markings will be paid for at the Contract unit price per square foot in accordance with Section 627.09, Method of Measurement.

~~If allowed by Special Provision, the Contractor may utilize Temporary Bi-Directional Yellow and White (as required) Delineators. When utilized, payment will be made as temporary pavement marking lines, measured and paid at the contract unit price per linear foot. Such payment will include as many applications as required and removal.~~

—Payment for final plastic pavement lines and markings will be made in two parts. The first payment of 75 percent% will be made when plastic pavement lines and markings are placed. The payment of the remaining 25 percent% will be made at the end of the establishment period for all plastic line and pavement markings accepted.

—The accepted quantity of any pavement marking lines will be paid for at the Contract unit price and will include as many applications as required and removal when required.

The accepted quantity of Temporary Bi-directional Yellow Delineators will be paid for at the Contract unit price, complete, in place, and maintained.

—Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
627.18 12 inch Solid White Pavement Marking Line	Linear Foot
627.711 White or Yellow Pavement Marking Line - Plan Quantity	Linear Foot
627.733 4" White or Yellow Painted Pavement Marking Line	Linear Foot
627.744 6" White or Yellow Painted Pavement Marking Line	Linear Foot
627.75 White or Yellow Pavement & Curb Marking	Square Foot

Revised: February 28, 2025

627.77	Removing Existing Pavement Marking	Square Foot
627.78	Temporary 4" Painted Pavement Marking Line, White or Yellow	Linear Foot
627.781	Temporary 6" Painted Pavement Marking Line, White or Yellow	Linear Foot
627.407	Reflectorized Plastic, White or Yellow Pavement Marking	Square Foot
627.4071	Reflectorized Plastic, White or Yellow Pavement Marking Line - Plan Quantity	Linear Foot
627.811	Temporary Bi-directional Yellow Delineators	Each

Remove & Replace 660.07 \$660.08

Proposed Standard Specification Revision

660.07 Basis of Payment to the Contractor. The OJT obligation shall be paid at the unit price of \$15.00 per hour once training of an OJT trainee in accordance with the terms of the Contract is successfully completed as provided below. Payment will be made even though the Contractor may have received additional training program funds from other sources, provided such other sources do not prohibit the Contractor from receiving other payment.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of reasonable efforts (as defined below) on the part of the Contractor in meeting the requirements of this Section.

A Contractor will have fulfilled its responsibilities under this Section if it has provided acceptable training to the number of trainees specified in the Contract.

The chart below illustrates the operation of the OJT program training requirements.

FOR EACH OJT CLASSIFICATION OF 1,000 HOURS			
Stage	Hours Fulfilled	Are completed hours allowable?	Must remaining hours be fulfilled?
I.	0- 499	N	Y
II.	500- 750	Y	Y
III.	751- 899	Y	Y
IV.	900- 1000	Y	N

As an example, if the goal on the project is 1,000 hours and only one trainee reaches the 500 minimum threshold, then the Contractor will be reimbursed for the 500 hours obtained and must continue to train a new trainee for the remaining 500 hours.

However, if the OJT obligation on the project is 1,000 hours and the trainee receives less than the 500-hour minimum training, the Contractor will not receive reimbursement.

If a trainee quits the project voluntarily or is dismissed, then the Contractor is required to fill the trainee slot as soon as possible and shall be reimbursed according to this Section. The hours completed by the previous trainee will not be counted toward the new trainee if the original trainee has not obtained the 500 hours.

If the remaining number of hours needing to be fulfilled is 500 hours of a 1,000 requirement, the Contractor must make reasonable efforts to hire a trainee for a 500-hour training classification or extend the training to 1,000 hours. In that event, the Contractor will receive credit for the hours achieved.

The goal is for the OJT to achieve 1,000 hours of training, graduate from the OJT Program as a journey level worker, and be hired by the Contractor as a regular employee. However, if an OJT quits or is dismissed for any reason, the Contractor will be able to retain the number of hours over 500 hours per trainee. However, the Contractor must still fulfill the remaining hours of the OJT obligation.

The Contractor can hire a trainee for a specified 500-hour training. The trainee cannot be put into a 1,000-hour training, reach 500 hours, and be considered complete. The trainee either has to be enrolled in a

specific 500-hour training or the Contractor can add 500 hours to bring on a new OJT for a 1,000-hour training. The Civil Rights Office will allow the addition of OJT hours for this purpose.

As used in this Section 660.07, "reasonable efforts" means taking fair, practical, and genuine steps to achieve an objective. "Reasonable efforts" may include one or more of the following: advertisements in area newspapers; social media postings; employee referrals; outreach recruitment with third-party entities; flyer postings at locations such as grocery stores, laundromats, and other community buildings accessible to the public; union or employment agency contacts; Maine CareerCenter contacts; and Job Fair attendance. Documentation of reasonable efforts must be submitted to the Department's Civil Rights Office.

660.08 Sanctions. When the Department determines that the Contractor has not complied with Section 660.07, the Department will advise the Contractor in writing within 10 days of such determination that the Contractor must provide evidence that it has made reasonable efforts (as defined in Section 660.07 above) to comply. If, after reviewing such evidence, the Department determines that reasonable efforts were not made, sanctions will be imposed as follows:

The number of required training hours remaining to be completed will be multiplied by the prevailing wage plus fringe rate for that particular trainee's classification. The resulting figure may be deducted from any monies due the Contractor. A corrective action plan may be developed in order to avoid similar future findings.

SECTION 652 - MAINTENANCE OF TRAFFIC

652.1 Description This work shall consist of furnishing, installing, maintaining and removing traffic control devices necessary to provide reasonable protection for motorists, pedestrians and construction workers in accordance with these Specifications ~~and~~ the applicable provisions of Section 105.4.5 – Maintenance of Existing Structures.

Traffic control devices include signs, signals, lighting devices, markings, barricades, channelizing, and hand signaling devices, traffic officers, and flaggers.

652.2 Materials All traffic control devices shall conform to the requirements of Part VI of the latest edition of the MUTCD, and MASH 16 guidelines.

All signs shall be fabricated with high intensity fluorescent retroreflective sheeting conforming to ASTM D 4956 - Type VIII, or Type IX (prismatic). All barricades, drums, and vertical panel markers shall be fabricated with high intensity orange and white fluorescent retroreflective sheeting conforming ASTM D 4956 - Type VII, Type VIII, or Type IX (prismatic).

Construction signs shall be fabricated from materials that are flat, free from defects, retro-reflectORIZED, and of sufficient strength to withstand deflections using a wind speed of 80 miles ~~per hour.~~ ~~hr.~~

All barricades, cones, drums, and construction signs may be constructed from new or recycled plastic.

652.2.2 Signs Only signs with symbol messages conforming to the design of the Manual of Uniform Traffic Control Devices shall be used unless the Resident approves the substitution of word messages.

652.2.3 Flashing Arrow Boards Flashing Arrows must be of a type that has been submitted to AASHTO's National Transportation Product Evaluation Program (NTPEP) for evaluation.

Flashing Arrow Boards units shall meet requirements of the current Manual on Uniform Traffic Control Devices (MUTCD) for Type "C" as described in Section 6F.56 - Temporary Traffic Control Devices. ~~Each A~~ Flashing Arrow Board shall have a matrix of a minimum of 15 low-glare, sealed beam, Par 46 elements capable of either flashing or sequential displays as well as the various operating modes as described in the MUTCD, Chapter 6-F. If a flashing Arrow Board consisting of a bulb matrix is used, each element should be recess-mounted or equipped with an upper hood of not less than 180 degrees. The color presented by the elements shall be yellow.

Flashing Arrow Boards elements shall be capable of at least a 50 percent dimming from full brilliance. Full brilliance should be used for daytime operations and the dimmed mode shall be used for nighttime operations. Flashing Arrow Boards shall be at least 96 inches x 48 inches and finished in non-reflective black. The Flashing Arrow Boards shall be interpretable for a distance not less than 1 mile.

Operating modes shall include, flashing arrow, sequential arrow, sequential chevron, flashing double arrow, and flashing caution. In the three arrow signals, the second light from the arrow point shall not operate.

The minimum element on-time shall be 50 percent for the flashing mode, with equal intervals of 25 percent for each sequential phase. The flashing rate shall be not less than 25 nor more than 40 flashes per minute. All on-board circuitry shall be solid state.

The Primary power source shall be 12-volt solar with a battery back-up to provide continuous operation when failure of the primary power source occurs, up to 30 days with fully charged batteries. Batteries must be capable of being charged from an onboard 110 volt AC power source and the unit shall be equipped with a cable for this purpose.

Controller and battery compartments shall be enclosed in lockable, weather-tight boxes.

The Flashing Arrow Boards shall be mounted on a pneumatic-tired trailer or other suitable support for hauling to various locations, as directed. The minimum mounting height of an arrow panel should be 7 feet from the roadway to the bottom of the Flashing Arrow Boards.

The face of the trailer shall be delineated on a permanent basis by affixing retro-reflective material, known as conspicuity material, in a continuous line as seen by oncoming drivers.

A portable changeable message sign may be used to simulate an arrow panel display.

652.2.4 Other Devices Vertical panel markers shall be orange and white striped, 8 inches wide by 24 inches high. On the Interstate System, vertical panel markers shall be orange and white striped, 12 inches wide by 36 inches high.

Cones shall be orange in color, at least 28 inches high, and retro-reflectorized. Retro-reflection shall be provided by a white band of retro-reflective sheeting conforming to Section 719.01, 6 inches wide, no more than 3 to 4 inches from the top of the cone, and a 4 inch wide white band at least 2 inches below the 6 inch band.

Drums shall be of plastic or other yielding material, and shall be approximately 36 inches high and a minimum of 18 inches in diameter. There shall be at least two retro-reflectorized orange and at least two retro-reflectorized white stripes at least 4 inches wide on each drum. Metal drums shall not be used.

Warning lights and battery operated flashing and steady burn lights shall conform to the requirements Section 712.23 - Flashing Lights.

Flaggers shall use a STOP / SLOW hand held paddle as the primary and preferred hand signaling device. Flags shall only be limited to emergencies.

STOP / SLOW paddles shall have high intensity prismatic retro reflective sheeting, have an octagonal shape on a rigid handle and shall be at least 18 inches wide with letters at least 6 inches high and shall be constructed from light semi-rigid material. The STOP (R1-1) face shall have white letters and a white border on a red background. The SLOW (W20-8) face shall have black letters and a black border on an orange background.

STOP / SLOW paddles shall also incorporate either white or red flashing lights on the STOP face and white or yellow flashing lights on the SLOW face of the paddle and always be in use.

Paddles must conform to any of the following patterns:

- A. Two white or red lights (colors shall be all white or all red), one centered vertically above and one centered vertically below the STOP legend; and/or two white or yellow lights (colors shall be all white or all yellow), one centered vertically above and one centered vertically below the SLOW legend.
 - B. Two white or red lights (colors shall be all white or all red), one centered horizontally on each side of the STOP legend; and/or two white or yellow lights (colors shall be all white or all yellow), one centered horizontally on each side of the SLOW legend.
 - C. One white or red light centered below the STOP legend; and/or one white or yellow light centered below the SLOW legend.
 - D. A series of eight or more small all white or all red lights no larger than 1/4 inch in diameter along the outer edge of the paddle, arranged in an octagonal pattern at the eight corners of the border of the STOP face; and/or a series of eight or more small all white or all yellow lights no larger than 1/4 inch in diameter along the outer edge of the paddle, arranged in a diamond pattern along the border of the SLOW face.
 - E. A series of white lights forming the shapes of the letters in the legend.
- Flashing light patterns shall be compliant with Section 6E.03 Hand Signaling Devices in the most current version of the Manual on Uniform Traffic Control Devices.

All flashing light patterns on the STOP / SLOW paddle shall be visible from a minimum distance of 1,000 feet.

Type I barricades shall be 2 feet minimum, 8 feet maximum, in length with an 8 inch wide rail mounted 3 feet minimum above the ground. Type II barricades shall be 2 feet in

length with two 8 inch wide rails, and the top rail shall be mounted 3 feet minimum above the roadway. Type III barricades shall be 8 feet in length with three 8 inch wide rails, and the top rail shall be mounted 5 feet minimum above the roadway. The cross members of all barricades shall be of $\frac{1}{2}$ or $\frac{5}{8}$ inch thick plywood or other lightweight rigid material such as plastic, fiberglass or fiber wood as approved by the Resident. The predominant color for supports and other barricade components shall be white, except that unpainted galvanized metal or aluminum components may be used.

652.2.5 Portable Changeable Message Sign Trailer mounted Portable Changeable Message Signs (PCMS) must be of a type that has been submitted to AASHTO's National Transportation Product Evaluation Program (NTPEP) for evaluation. The PCMS unit shall meet or exceed the current specifications of the Manual on Uniform Traffic Control Devices (MUTCD), 6F.55.

The front face of the sign should be covered with a low-glare protective material. The color of the LED elements shall be amber on a black background. The PCMS should be visible from a distance of one-half 0.5-mile, day and night, and have a minimum 15 degree viewing angle. Characters must be legible from a distance of at least 650 feet.

The message panel should have adjustable display rates (minimum of 3 seconds per phase), so that the entire message can be read at least twice at the posted speed, the off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed. Each message shall consist of either one or two phases. A phase shall consist of up to eight characters per line. The unit must be capable of displaying at least three lines of text with eight characters per line. Each character shall be 18 inches high. Each character module shall use at least a five wide and seven high pixel matrix. The text of the messages shall not scroll or travel horizontally or vertically across the face of the sign.

Units shall automatically adjust their brightness under varying light conditions to maintain legibility.

~~The control system shall include a display screen upon which messages can be reviewed before being displayed on the message sign. The control system shall be capable of maintaining memory when power is unavailable. Message must be changeable with either a notebook computer or an on-board keypad. The controller shall have the capability to store a minimum of 200 user-defined and 200 pre-programmed messages. Controller and battery compartments shall be enclosed in lockable, weather-tight boxes.~~

The control system shall include a display screen upon which messages can be reviewed before being displayed on the message sign. The control system shall be capable of maintaining memory when power is unavailable. Messages must be changeable with either a portable electronic device like a notebook computer or an on-board keypad. The controller shall have the capability to store a minimum of 200 user-defined and 200 pre-programmed messages. Controller and battery compartments shall be enclosed in lockable, weather-tight boxes. The cabinet shall be locked at all times that the Contractor is not actively changing the message. The Contractor shall change the password for the controller prior to stationing

the PCMS and shall provide the password to the Resident. The password shall be unique per PCMS and secure and shall not be written anywhere in, on, around, or stored in the PCMS.

PCMS units shall have the capability of being made programmable by means of wireless communications. PCMS units shall also be fully capable of having an on-board radar system installed if required for a particular application.

The PCMS² primary power source shall be solar with a battery back-up to provide continuous operation when failure of the primary power source occurs. Batteries must be capable of being charged from a 110-volt AC power source. The unit must also be capable of being operated solely from a 110-volt AC power source and be equipped with a cable for this purpose.

The PCMS shall be mounted on a trailer in such a way that the bottom of the message sign panel shall be a minimum of 7 feet above the roadway in urban areas and 5 feet above the roadway in rural areas when it is in the operating mode. PCMS trailers should be of a heavy-duty type with a 2 inch ball hitch and a minimum of four leveling jacks (one at each corner). The sign shall be capable of being rotated 360 degrees² relative to the trailer. The face of the trailer shall be delineated on a permanent basis by affixing retro-reflective material, known as conspicuity material, in a continuous line as seen by oncoming drivers.

652.2.6 Device Crashworthiness MaineDOT is transitioning to MASH2016 criteria for Work Zone Traffic Control Devices on the following schedule:

- Category 1 (Cones, Drums, Tubular Markers, Flexible Delineators, and similar devices that have little chance of causing windshield penetration, tire damage, or other significant effect on the control or trajectory of a vehicle) – All Category 1 devices will be manufacturer self-certified as MASH2016 by January 1, 2025. Current Category 1 devices in useful serviceable condition that are not self-certified as MASH2016 compliant may be utilized through December 31, 2024.
- Category 2 (Barricades, Portable Sign Supports, Category 1 devices with attachments, and similar devices that are not expected to produce significant vehicular velocity change but may be otherwise hazardous) – All Category 2 devices will be crash tested and/or evaluated to MASH2016 criteria by January 1, 2025. Current Category 2 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2024.
- Category 3 (Portable Concrete Barrier, Portable Crash Cushions, Truck Mounted Attenuators, Category 2 devices weighing more than 100 pounds, and similar devices that are expected to produce significant vehicular velocity change or other harmful reactions) – All Category 3 devices will be crash tested and/or evaluated to MASH2016 criteria by January 1, 2030. Current Category 3 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or

MASH2009 criteria may be utilized through December 31, 2029. (See Standard Specification 526 for additional Portable Concrete Barrier information).

- Category 4 (Trailer Mounted Devices: Arrow Boards, Temporary Traffic Control Signals, Area Lighting, Portable Changeable Message Signs, and other similar devices.) – All Category 4 devices will be crash tested and/or evaluated to MASH2016 criteria by January 1, 2030. Current Category 4 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2029.

CONSTRUCTION REQUIREMENTS

652.3.1 Responsibility of the Department The Department will provide Project traffic requirements such as allowable lane or road closures, minimum temporary lane widths, work zone speed limits, timing limitations, and allowable special detours and temporary structures. No revisions to these requirements will be permitted unless the Contractor can thoroughly demonstrate an overall benefit to the public and a Contract Modification is approved.

652.3.2 Responsibility of the Contractor The Contractor shall provide continuous and effective traffic control and management for the Project that is appropriate to the construction means, methods, and sequencing allowed by the Contract and selected by the Contractor.

652.3.3 Submittal of Traffic Control Plan The Contractor shall submit, at or before the Preconstruction Meeting, a Traffic Control Plan (TCP) that provides the following information to the Department:

- a. The name, telephone number, and other contact numbers (cellular phone, ~~pager, if any~~) of the Contractor's Traffic Control Supervisor (TCS). The TCS is the person with overall responsibility for ~~insuring~~ the Contractor follows the TCP, and who has received Work Zone Traffic Control Training commensurate with the level of responsibility shown in the requirements of the Contract, and who is empowered to immediately resolve any work zone traffic control deficiencies or issues. Provide documentation that the Traffic Control Supervisor has completed a Work Zone Traffic Control Training Course (AGC, ATSSA, or other industry-recognized training), and a Supervisory refresher training every 5 years thereafter. Submit training certificates or attendance rosters that includes the course name, training entity, and date of training.

Traffic Control Training Course curriculum must be based on the standards and guidelines of the MUTCD and must include, at a minimum, the following:

1. Parts of Temporary Traffic Control Zone
2. Appropriate use and spacing of signs
3. Use and spacing of channelizing devices
4. Flagging basics

5. Typical examples and applications

The Traffic Control Supervisor, or designee directly overseeing physical installation, adjustment, and dismantling of work zone traffic control, will ensure all personnel performing those activities are trained to execute the work in a safe and proper manner, in accordance with their level of decision-making and responsibility.

- b. Proposed construction phasing or sequencing that reasonably minimizes traffic impacts. The Contractor shall conduct the Work such that traffic delays do not exceed 10 minutes unless longer periods are authorized by the Department. The Contractor shall provide advance signing to warn motorists of expected traffic backups or queues.
- c. A written narrative and/or plan explaining how traffic and pedestrians will be moved through the Project Limits, including transitions during the change from one phase of construction to the next, as applicable.
- d. Temporary traffic control treatments at all intersections with roads, rail crossings, businesses, parking lots, pedestrian ways, bike paths, trails, residences, garages, farms, and other access points, as applicable.
- e. A list of all Contractor or Subcontractor certified flaggers to be used on the Project, together with the number of flaggers which will be used for each type of operation that flagging is needed. If the Contractor is using a flagging Subcontractor, then the name and address of the Subcontractor may be provided instead of a list of flaggers.
- f. A procedure for notifying the Resident, local emergency officials, and local government officials (including the name and phone numbers of such officials) whenever significant traffic impacts are anticipated or occur and the plan for removing all lane restrictions in case of emergency or significant traffic impact. For a related provision, see Section 105.2.3 - Project Specific Emergency Planning.
- g. A description of any special detours including provisions for constructing, maintaining, signing, and removing the detour or detours, including all temporary bridges and accessory features and complete restoration of the impacted land.
- h. The maximum length of requested contiguous lane closure. The Contractor shall not close excessive lengths of traffic lane to avoid moving traffic control devices.
- i. The proposed temporary roadway surface conditions and treatments. The Contractor shall provide an adequate roadway surface at all times, taking into account traffic speed, volume, and duration.
- j. The coordination of appropriate temporary items (drainage, concrete barriers, barrier end treatments, impact attenuators, and traffic signals) with the TCP.

k. The plan for unexpected nighttime work. ~~The Contractor~~ shall provide a list of emergency nighttime lighting equipment and safety personnel available on-site or have the ability to have them on site within an hour of the time of need.

l. The plan for meeting any project-specific requirements included contained in any Section 105 and/or 107 sSpecial Pprovisions. 105 and/or 107

m. The lighting plan if night work is anticipated.

n. A security plan for any PCMS shall be included. The Contractor shall provide a plan for secure access to the PCMS and protection from unauthorized users. The plan shall have details on securing the cabinets via a lock and password from unauthorized users, password changing protocols, and where the access information will be kept so it can be used in the event of emergency. The Contractor shall not identify or store passwords in the TCP.

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2024 version

The Department will review the TCP for completeness and conformity with Federal requirements, Contract provisions, the current edition of the MUTCD, and Department policy and procedures. The Department will review and provide comments to the Contractor within 14 days of receipt of the TCP. No review or comment by the Department, or any failure to review or comment, shall relieve the Contractor of its responsibility to design and implement the plan in accordance with the Contract, or to shift any responsibility to the Department. If the TCP is determined by the Department to be operationally ineffective, the Contractor shall submit modifications of the TCP to the Department for review, and shall implement these changes at no additional cost to the Contract. Nothing in this Section shall negate the Contractor's obligations set forth in Section 110 - Indemnification, Bonding, and Insurance. The creation and modification of the TCP will be considered incidental to the related 652 items.

652.3.4 General Prior to starting any work on any part of the project adjacent to or being used by the traveling public, the Contractor shall install the appropriate traffic control devices in accordance with the plans, specifications and the latest edition of the Manual of Uniform Traffic Control Devices, Part VI. The Contractor shall continuously maintain the traffic control devices in their proper position, and they shall be kept clean, legible and in good repair throughout the duration of the work. If notified that the traffic control devices are not in place or not properly maintained, the Contractor may be ordered to immediately suspend work until all deficiencies are corrected.

No equipment or vehicles of the Contractor, their Subcontractors, or employees engaged in work on this Contract shall be parked or stopped on lanes carrying traffic, or on lanes or shoulders adjacent to lanes carrying traffic, at any time, except as required by ongoing work operations. Contractor equipment or vehicles shall never be used to stop, block, or channelize traffic, unless expressly allowed otherwise in the Contract.

The Contractor shall not store material or park equipment within 15 feet of the edge of the established travel lanes. Equipment parked overnight between 15 and 30 feet of the edge

of the travel lane shall be placed behind positive barriers if feasible, or clearly marked by channelizing devices or other reflective devices.

Channelization devices shall include Vertical Panel Markers, Barricades, Cones, and Drums. These devices shall be installed and maintained at the spacing determined by the MUTCD through the work area.

Channelization devices consisting of barricades or drums, at a maximum spacing of 50 feet, shall be used in guardrail areas when neither the existing guardrail nor the new guardrail is in place.

The Contractor shall maintain existing guardrails and/or barriers until removal is necessary for construction. The Contractor shall use ~~a portable temporary~~ barrier or appropriate channelizing devices while the guardrails and/or barriers are absent. Permanent guardrails and barriers shall be installed as soon as possible to minimize risk to the public.

All excavation areas adjacent to the roadway shall be channelized continuously in both directions for the length of the project in all areas where the centerline strip is not effective in accordance with the latest edition of the MUTCD.

Where the roadway is adjacent to an area being excavated, a minimum ~~2-foot~~ shoulder ~~should shall~~ be maintained and the effective slope of the earth excavation beyond the ~~2-foot~~ shoulder shall not be steeper than a 1½ horizontal to 1 vertical. The effective slope of rock excavation shall not be steeper than 1 horizontal to 1 vertical beyond the ~~2-foot~~ shoulder. In the case of cuts over 5 feet deep, ~~portable concrete barrier a Concrete Barrier~~ or other approved barrier shall be placed between the travel lane and the excavated area.

In this instance, travel speeds shall be limited by specific advisory signing to 20 miles per hour in all cases. When excavation does not leave sufficient usable widths to maintain two-way traffic as provided in Section 105.4, Maintenance of Work, one-lane traffic controlled by a traffic signal or continuous flagging may be considered. Closely spaced vertical panels, drums or other channelizing devices shall be used on any of these types of areas that are left exposed for short durations.

When paving operations or shoulder grading leave a 3 inch or less exposed vertical face at the edge of the traveled way, channelization devices shall be placed 2 feet outside the edge of the pavement at intervals not exceeding 600 feet and a ~~48-inch~~ by ~~48-inch~~ W8-9 Low Shoulder sign shall be placed at a maximum spacing of ~~one-half~~ ½ mile. When paving operations or shoulder grading leave greater than a ~~3-inch~~ exposed vertical face at the edge of the traveled way, the Contractor shall place shoulder material for a width of at least 4 feet to meet the pavement grade, and place channelizing devices as ~~described~~ above, before the lane is opened to traffic.

A temporary ramp shall be constructed with HMA at the ends of the roadway section paved or milled each day. The use of millings or RAP will not be allowed, but cold patch may be temporarily utilized until HMA plants are open for the season. The maximum ramp

change in elevation shall not exceed 4 inches vertical. For Interstate Hhighways or roadways with speed limits equaling or exceeding 50 mph, temporary ramps shall be constructed at a length of eight feet per inch of transition depth. For roadways with speed limits less than 50 mph and greater than 25 mph, temporary ramps shall be constructed at a length of four feet per inch of transition depth. For roadways with speed limits of 25 mph or less, temporary ramps shall be constructed at a length of two feet per inch of transition depth. Materials, placement, maintenance, and removal of temporary ramps shall be considered incidental to related Contract items.

Special Detours and temporary structures, if used, shall meet applicable AASHTO standards, including curve radii and grade.

652.3.5 Installation of Traffic Control Devices All traffic control devices shall be in conformance with NCHRP 350 requirements and installed as per manufacture's recommendations.

Portable signs shall be erected on temporary sign supports approved crashworthy devices so that the bottom of the sign is either 1) 12 inches or 2) greater than 5 feet above the traveled way. Post-mounted signs shall be erected so the bottom of the sign is no less than 5 feet above the traveled way, and 7 feet above the traveled way in business, commercial, and residential areas. Post-mounted signs must be erected so that the sign face is in a true vertical position. All signs shall be placed so that they are not obstructed in any manner and immediately modified to ensure proper visibility if obstructed. Signs may be mounted lower or higher to fit the situation when authorized by the Resident. Cones shall be either weighted or nailed. Tires will not be allowed as weights.

Vertical panel markers shall be mounted with the top at least 4 feet above the traveled way.

Drums shall not be weighted on the top. Drain holes shall be provided to prevent water from accumulating in the drums. Drums may be weighted with up to 6 inches of loose dry sand.

The Contractor shall operate and maintain the flashing arrow board unit and trailer and shall continuously supply fuel and lubrication for dependable service during the life of the eContract. The units shall remain in continuous night and day service at locations designated until the Resident authorizes designates the unit to be moved to a new location or authorizes discontinuance of service of the unit.

The Contractor shall maintain the devices in proper position and clean them as necessary. Maintenance shall include the covering and uncovering of all signs when no longer applicable (even if for a very short duration). The sign shall be considered adequately covered when no part of the sign face is visible either around or through the covering.

The Contractor shall replace damaged traffic control devices with devices of acceptable quality, as directed by the Resident.

652.3.6 Traffic Control The Contractor shall provide a minimum roadway width of 22 feet for two-way traffic and 11 feet for one-way traffic. The existing travel way width shall be maintained to the maximum extent practical. Vertical panel markers, drums, cones, or striping shall be used to clearly delineate the roadway through the construction area. Two-way traffic operation shall be provided at all times that the Contractor is not working on the project, unless otherwise allowed by the Contract. One-way traffic shall be controlled through work areas by flaggers, utilizing radios, field telephones, or other means of direct communication.

The traffic control devices shall be moved or removed as the work progresses to assure compatibility between the uses of the traffic control devices and the traffic flow. Traffic control devices that become unnecessary shall be immediately removed from use.

Pavement markings shall be altered as required to conform to the existing traffic flow pattern. Repainting of pavement marking line, if required to maintain the effectiveness of the line, as determined by the Resident, will shall be paid for under the appropriate Pay Items, considered maintenance of traffic control devices. No separate payment will be made. Inappropriate existing pavement markings shall be removed whenever traffic is rerouted, and temporary construction pavement markings shall be placed. Obliteration and removal of non-applicable markings and placement of temporary construction pavement markings shall be considered maintenance of traffic control devices and will be paid for under the appropriate Contract Pay Item. Traffic changes shall not be made unless there is sufficient time, equipment, materials, and personnel available to complete the change properly before the end of the workday. This provision will not be required when traffic is rerouted for brief periods during daylight hours and the route can be clearly defined by channelizing devices, or flaggers, or both.

652.4 Flaggers The Contractor shall furnish flaggers as required by the TCP or as otherwise specified by the Resident. All flaggers must have successfully completed a flagger test approved by the Department and administered by a Department-approved Flagger-Certifier who is employing that flagger. All flaggers must carry an official certification card with them while flagging that has been issued by their employer. The Contractor shall furnish flaggers as required by the TCP or as otherwise specified by the Resident. All flaggers must have successfully completed a flagger test approved by the Department and administered by a Department-approved Flagger-Certifier. All flaggers must carry an official certification card with them at all times while flagging.

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For daytime conditions, flaggers shall wear a top (vest, shirt or jacket) that is orange, yellow, yellow-green, or fluorescent versions of these colors meeting ANSI 107-2004, Class 2 or Class 3, along with a hardhat with 360 degree visible retro-reflectivity.

For nighttime conditions, flaggers shall wear all Class 3 apparel, meeting ANSI 107-2004, including a Class 3 top (vest, shirt or jacket) and a Class E bottom (pants or

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coveralls); ~~flaggers shall also wear hardhats -shall be worn along with a hardhat~~ with 360 ~~degree- visible~~ retro-reflectivity and shall be visible at a minimum distance of 1,000 feet. Flagger stations must be illuminated in nighttime conditions to assure visibility and will be specifically addressed in detail in the Contractor's TCP.

Flagger stations shall be located far enough in advance of the workspace so that approaching road users will have sufficient distance to stop at the intended stopping point. While flagging, the flagger should stand either on the shoulder adjacent to the traffic being controlled, or in the closed lane. At a spot obstruction with adequate sight distance, the flagger may stand on the shoulder opposite the closed sections to operate effectively. Under no circumstances shall the flagger stand in the lane being used by moving traffic or have their back to oncoming traffic. The flagger should be clearly visible to approaching traffic at all times and should have a clear escape route.

When conditions do not allow for proper approach sight distance of a flagger or storage space for waiting vehicles, additional flaggers shall be used at the rear of the backlogged traffic or at a point where approaching vehicles have adequate stopping sight distance to the rear of the backlogged traffic. All flagger stations shall be signed, even when in close proximity. The signs shall be removed or covered when flagger operations are not in place, even if it is for a very short duration.

Flaggers shall be provided ~~as a minimum, a 10-minute break,~~ minimum, every 2 hours and a 30 minute, minimum, ~~or longer~~ lunch period away from the work station. Flaggers may only receive one unpaid break per day; all other breaks must be paid. Sufficient certified flaggers shall be available onsite to provide for continuous flagging operations during break periods. If the flaggers are receiving the appropriate breaks, breaker flagger(s) shall be paid starting 2 hours after the work begins and ending 2 hours before the work ends. A maximum of 1 breaker per 6 flaggers will be paid. (1 breaker flagger for 2 to 6 flaggers, 2 breaker flaggers for 7 to 12 flaggers, ~~etc.~~). If a flagger station is manned for 10 hours or more, then one-half hour for lunch will be deducted from the billable breaker flagger hours.

652.4.1 Traffic Officers Traffic officers will be uniformed police officers.

652.5 Warning Lights Warning lights shall be installed at locations designated by the Resident before any work is done on the portions of roadway being used by traffic. Upon installation, all warning lights shall remain in continuous operation during the life of the project, unless otherwise authorized by the Resident.

When a suitable 120-volt AC power service source is available within 500 feet of the designated warning light location, power operated flashing lights shall be installed. Two alternately flashing lamps shall be mounted approximately 24 inches above the sign, spaced approximately 24 inches apart.

When a suitable 120-volt AC power service source is not available, battery operated flashing lights may be erected. Four flashing lamps shall be mounted approximately 6 inches above the sign, spaced approximately 12 inches apart.

The power service connections shall be installed to the satisfaction of both the power company and the Resident. The Contractor shall make all necessary arrangements for the power service connections and be responsible for all charges incurred thereby, including power charges. The Contractor shall also be responsible for all outstanding bills from the electric power company for preliminary work done by the electric company for the power service connection.

When batteries are required for battery operated flashing lights, they shall be provided and replaced by the Contractor as necessary.

652.5.1 Rumble Strip Crossing When lane shifts or lane closures require traffic to cross a permanent longitudinal rumble strip for 7 calendar days or less, the Contractor shall install warning signs that read "RUMBLE STRIP CROSSING" with a supplemental Motorcycle Plaque, (W8-15P).

When lane shifts or lane closures require traffic to cross a permanent longitudinal rumble strip for more than 7 calendar days, the Contractor shall pave in the rumble strips in the area that traffic will cross, unless otherwise directed by the Resident. Rumble strips shall be replaced prior to the end of the project, when it is no longer necessary to cross them.

652.6.1 Daylight Work Times Unless otherwise described in the Contract, the Contractor is allowed to commence work and end work daily according to the Sunrise/Sunset times procured at: <https://www.sunrisesunset.com/usa/Maine/>. If the Project town is not listed, the closest town on the list will be used as agreed at the Preconstruction Meeting. Any work conducted before sunrise or after sunset will be considered Night Work.

652.6.2 Night Work When Night Work occurs (either scheduled or unscheduled), the Contractor shall provide and maintain lighting on all equipment, at all work stations, and all flagger stations.

The lighting facilities shall be capable of providing light of sufficient intensity to permit good workmanship, safety and proper inspection at all times. The lighting shall be cut off and arranged on stanchions at a height that will provide perimeter lighting for each piece of equipment and will not interfere with traffic, including commercial vehicles, approaching the work site from either direction.

The Contractor shall have available portable floodlights for special areas.

The Contractor shall utilize padding, shielding or other insulation of mechanical and electrical equipment, if necessary, to minimize noise, and shall provide sufficient fuel, spare lamps, generators, etc. to maintain lighting of the work site.

The Contractor shall submit, as a subset of the Traffic Control Plan, a lighting plan at the Preconstruction Conference, showing the type and location of lights to be used for night work. The Resident may require modifications be made to the lighting set up in actual field conditions.

Prior to beginning any Night Work, the Contractor shall furnish a light meter for the Residents use that is capable of measuring the range of light levels from 5 to 20 foot-candles.

Horizontal illumination, for activities on the ground, shall be measured with the photometer parallel to the road surface. For purposes of roadway lighting, the photometer is placed on the pavement. Vertical illumination, for overhead activities, shall be measured with the photometer perpendicular to the road surface. Measurements shall be taken at the height and location of the overhead activity.

Night Work lighting requirements:

Mobile Operations: For mobile-type operations, each piece of equipment (paver, roller, milling machine, etc.) will carry indirect (i.e. balloon type) lights capable of producing at least 10 foot-candles of lighting around the work area of the equipment.

Fixed Operations: For fixed-type operations (flaggers, curb, bridge, pipes, etc.), direct (i.e. tower) lighting will be utilized capable of illuminating the work area with at least 10 foot-candles of light.

Hybrid Operations: For hybrid-type operations (guardrail, sweeping, Inslope excavation, etc.), either direct or indirect lighting may be utilized. The chosen lights must be capable of producing at least 10 foot-candles of light around the work area of the equipment.

Inspection Operations: Areas required to be inspected by the Department will require a minimum of 5 foot-candles of lighting. This may be accomplished through direct or indirect means.

All workers shall wear safety apparel labeled as meeting the ANSI 107-2004 standard performance for Class 3 risk exposure.

The Contractor shall apply 2- inch wide retro-reflective tape, with alternating red and white segments, to outline the front back and sides of construction vehicles and equipment, to define their shape and size to the extent practicable. Pickup trucks and personal vehicles are exempt from this requirement. The Contractor shall furnish approved signs reading "Construction Vehicle - Keep Back" to be used on trucks hauling to the project when such signs are deemed necessary by the Resident. The signs shall be a minimum of 30 inches by 60 inches, Black and Orange, ASTM D 4956 - Type VII, Type VIII, or Type IX (prismatic).

All vehicles used on the project, including pickup trucks and personal vehicles, shall be equipped with amber flashing lights, visible from both front and rear, or by means of single, approved type, revolving, flashing or strobe lights mounted ~~such that they are so-as-to-be-visible from 360 degrees~~. The vehicle flashing system shall be in continuous operation while the vehicle is on any part of the project.

The Resident or any other representative of the Department reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Department shall not be held responsible for any delay in the work due to any suspension under this item. Failure to follow the approved Lighting Plan will result in a Traffic Control violation.

Payment for lighting, vehicle mounted signs and other costs accrued because of night work will not be made directly but will be considered incidental to ~~the~~ related Cecontract items.

652.7 Method of Measurement Signs and panel markers will be measured by the square foot for all signs authorized and installed. Flashing arrow boards, portable-changeable message signs, and flashing and steady burn lights, will be measured by each unit authorized and installed on the project. Barricades, drums, and cones will be measured by each unit authorized. No additional payment will be made for devices that require replacement due to poor condition or inadequate retro-reflectivity.

The accepted quantity of traffic officer and flagger time will be the number of hours the designated station is occupied. The number of hours authorized for payment will be measured to the nearest one-quarter $\frac{1}{4}$ hour.

Maintenance of traffic control devices will be measured by the calendar day or as one lump sum for all authorized and installed traffic control devices.

Warning lights will be measured by the group of lights furnished.

652.8 Basis of Payment The accepted quantity of signs and panel markers will be paid for at the Cecontract unit price per square foot. Such payment will be full compensation for furnishing and installing all signs, sign supports, and all incidentals necessary to complete the installation of the signs.

The accepted quantity of flashing arrow boards, portable-changeable message signs, barricades, battery operated flashing and steady burn lights, drums, and cones will be paid for at the Cecontract unit price each for the actual number of devices authorized, furnished, and installed. Such payment shall be full compensation for all incidentals necessary to install and maintain the respective devices.

Failure by the Cecontractor to follow the Section Contracts 652 Special Provisions and Standard Specification and/or the Manual on Uniform Traffic Control Devices (MUTCD) and/or the Contractor's own Traffic Control Plan will result in a violation letter and result in

a reduction in payment as shown in the schedule below. The Resident, or any other representative of the Department, reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Department shall not be held responsible for any delay in the work due to any suspension under this item. Any reduction in payment under this Special Provision will be in addition to forfeiting payment of maintenance of traffic control devices for that day.

ORIGINAL CONTRACT
AMOUNT

From More Than	Up to and Including	Amount of Penalty Damages per Violation		
		1 st	2 nd	3 rd & Subsequent
\$0	\$1,000,000	\$250	\$500	\$1,250
\$1,000,000	\$2,000,000	\$500	\$1,000	\$2,500
\$2,000,000	\$4,000,000	\$1,000	\$2,000	\$5,000
\$4,000,000	and more	\$2,000	\$4,000	\$10,000

652.8.1 Maintenance of Traffic Control Devices

652.8.1.1 Payment by Calendar Day Maintenance of Traffic Control Devices will be paid for at the Ceontract unit price per calendar day for each calendar day that the Contractor maintains traffic as specified herein. Such payment will be full compensation for moving devices as many times as necessary; for replacing devices damaged, lost, or stolen; and for cleaning, maintaining, and removing all devices used for traffic control, ~~including replacing temporary pavement marking lines.~~

The Ceontract unit price per calendar day for Maintenance of Traffic Control Devices shall be full payment each day for such maintenance, encompassing all areas of the Ceontract, regardless of whether ~~or not~~ the work areas or projects are geographically separated.

652.8.1.2 Payment by Lump Sum Maintenance of Traffic Control Devices will be paid at the Ceontract lump sum price. Such payment will be full compensation for all days that the Contractor maintains traffic as specified herein, and for moving devices as many times as necessary; for replacing devices damaged, lost, or stolen; and for cleaning, maintaining, and removing all devices used for traffic control, ~~including replacing temporary pavement marking lines.~~

The Ceontract lump sum price for Maintenance of Traffic Control Devices shall be full compensation for all days for such maintenance, encompassing all areas of the Ceontract, regardless of whether ~~or not~~ the work areas or projects are geographically separated.

652.8.2 Other Items The accepted quantities of flagger hours will be paid for at the Ceontract unit price per hour for each flagging station occupied excluding lunch breaks, and for each approved breaker flagger. Overtime hours, as reported on the certified payrolls, will be paid at an additional 30 percent % of the bid price for Pay Item 652.38. The

computation and additional payment for overtime hours will occur during the project close-out process and will be paid as additional hours of 652.38 to the nearest one-quarter 1/4 hour. The Contract unit price shall be full compensation for hiring, transporting, equipping, supervising, and the payment of flaggers and all overhead and incidentals necessary to complete the work.

~~There will be no payment made under any 652 pay items after the expiration of the adjusted total contract time.~~

The accepted quantities of traffic officer hours will be paid for at the Contract unit price per hour for each station occupied, with no additional payment for overtime. This price shall be full compensation for supplying uniformed officers with police cruisers, and all incidentals necessary to complete the work, including transportation, equipment, and supervision.

The accepted quantities of warning lights will be paid for at the Contract unit price, per group, complete in place including the necessary power, and remaining in operation during active work of the project or as otherwise directed. Upon completion of the work, the lamps, fixtures, and the framework required to properly mount the lamps shall remain the property of the Contractor.

Payment for temporary pavement marking lines, re-application of temporary pavement marking lines and pavement marking removal will be made under the respective Ppay Items in Section 627 - Pavement Markings.

Payment for temporary traffic signals will be made under Section 643 - Traffic Signals.

There will be no payment made under any 652 Ppay Items after the expiration of the adjusted total Contract time.

Payment will be made under:

Pay Item	Pay Unit
652.30 Flashing Arrow	Each
652.31 Type I Barricade	Each
652.311 Type II Barricade	Each
652.312 Type III Barricades	Each
652.32 Battery Operated Light	Each
652.33 Drum	Each
652.34 Cone	Each
652.35 Construction Signs	Square Foot
652.36 Maintenance of Traffic Control Devices	Calendar Day
652.361 Maintenance of Traffic Control Devices	Lump Sum
652.37 Warning Lights	Group
652.38 Flaggers	Hour
652.381 Traffic Officers	Hour

652.41 Portable-Changeable Message Sign

Each

Remove 660.07 & 660.08 and
Replace with these.

Proposed Standard Specification Revision

660.07 Basis of Payment to the Contractor. The OJT obligation shall be paid at the unit price of \$15.00 per hour once training of an OJT trainee in accordance with the terms of the Contract is successfully completed as provided below. Payment will be made even though the Contractor may have received additional training program funds from other sources, provided such other sources do not prohibit the Contractor from receiving other payment.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of reasonable efforts (as defined below) on the part of the Contractor in meeting the requirements of this Section.

A Contractor will have fulfilled its responsibilities under this Section if it has provided acceptable training to the number of trainees specified in the Contract.

The chart below illustrates the operation of the OJT program training requirements.

FOR EACH OJT CLASSIFICATION OF 1,000 HOURS			
Stage	Hours Fulfilled	Are completed hours allowable?	Must remaining hours be fulfilled?
I.	0- 499	N	Y
II.	500- 750	Y	Y
III.	751- 899	Y	Y
IV.	900- 1000	Y	N

As an example, if the goal on the project is 1,000 hours and only one trainee reaches the 500 minimum threshold, then the Contractor will be reimbursed for the 500 hours obtained and must continue to train a new trainee for the remaining 500 hours.

However, if the OJT obligation on the project is 1,000 hours and the trainee receives less than the 500-hour minimum training, the Contractor will not receive reimbursement.

If a trainee quits the project voluntarily or is dismissed, then the Contractor is required to fill the trainee slot as soon as possible and shall be reimbursed according to this Section. The hours completed by the previous trainee will not be counted toward the new trainee if the original trainee has not obtained the 500 hours.

If the remaining number of hours needing to be fulfilled is 500 hours of a 1,000 requirement, the Contractor must make reasonable efforts to hire a trainee for a 500-hour training classification or extend the training to 1,000 hours. In that event, the Contractor will receive credit for the hours achieved.

The goal is for the OJT to achieve 1,000 hours of training, graduate from the OJT Program as a journey level worker, and be hired by the Contractor as a regular employee. However, if an OJT quits or is dismissed for any reason, the Contractor will be able to retain the number of hours over 500 hours per trainee. However, the Contractor must still fulfill the remaining hours of the OJT obligation.

The Contractor can hire a trainee for a specified 500-hour training. The trainee cannot be put into a 1,000-hour training, reach 500 hours, and be considered complete. The trainee either has to be enrolled in a

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specific 500-hour training or the Contractor can add 500 hours to bring on a new OJT for a 1,000-hour training. The Civil Rights Office will allow the addition of OJT hours for this purpose.

As used in this Section 660.07, "reasonable efforts" means taking fair, practical, and genuine steps to achieve an objective. "Reasonable efforts" may include one or more of the following: advertisements in area newspapers; social media postings; employee referrals; outreach recruitment with third-party entities; flyer postings at locations such as grocery stores, laundromats, and other community buildings accessible to the public; union or employment agency contacts; Maine CareerCenter contacts; and Job Fair attendance. Documentation of reasonable efforts must be submitted to the Department's Civil Rights Office.

660.08 Sanctions. When the Department determines that the Contractor has not complied with Section 660.07, the Department will advise the Contractor in writing within 10 days of such determination that the Contractor must provide evidence that it has made reasonable efforts (as defined in Section 660.07 above) to comply. If, after reviewing such evidence, the Department determines that reasonable efforts were not made, sanctions will be imposed as follows:

The number of required training hours remaining to be completed will be multiplied by the prevailing wage plus fringe rate for that particular trainee's classification. The resulting figure may be deducted from any monies due the Contractor. A corrective action plan may be developed in order to avoid similar future findings.