Town: **Waterville – County Road & CSX RR**
Project: **WIN 27184.20**
Date: **07/15/2024**

SPECIAL PROVISIONS
SECTION 104
Utilities

UTILITY COORDINATION

The Contractor has primary responsibility for coordinating their work with utilities after contract award. The Contractor shall communicate directly with the utilities regarding any utility work necessary to maintain the Contractor's schedule and prevent project construction delays. The Contractor shall notify the resident of any issues.

The Contractor shall notify all utilities a **minimum of 10 working days** prior to commencement of **any** work on the project.

THE CONTRACTOR SHALL PLAN AND CONDUCT WORK ACCORDINGLY.

MEETING

A Preconstruction Utility Conference, as defined in Subsection 104.4.6 of the Standard Specifications **IS NOT** required.

GENERAL INFORMATION

These Special Provisions outline the arrangements that have been made by the Department for utility and/or railroad work to be undertaken in conjunction with this project. The following list identifies all known utilities or railroads having facilities presently located within the limits of this project.

Utilities have been notified and will be furnished a project specification.

Overview of Utility/Railroad Involvement:

Utility/Railroad	Aerial	Underground or Railroad
CSX Railways – *Mike Sliper (518)767-6081*		X
Charter Communications *Chris Verzoni (207) 458-8017*	X	
GoNetspeed *Jim Knight (207) 590-5111*		X

Temporary utility adjustments **are not** anticipated. If any unexpected utility relocations become necessary, they shall be scheduled in accordance with Section 104 of the Standard Specifications and shall be performed by the appropriate utility company in conjunction with the work by the Contractor. Should the Contractor choose to have any poles temporarily relocated, all work shall be done at the Contractor's request and expense, with no additional cost or schedule impacts to the Department.

Unless otherwise specified, any underground utility facilities shown on the project plans represent approximate locations gathered from available information. The Department cannot certify the level of accuracy of this data. Underground facilities indicated on the topographic sheets (plan views) have been collected from historical records and/or on-site designations provided by the respective utility companies. Underground facilities indicated on the cross-sections have been carried over from the plan view data and may also include further approximations of the elevations (depths) based upon straight-line interpolation from the nearest manholes, gate valves, or test pits.

All adjustments are to be made by the respective utility unless otherwise specified herein.

Utility working days are Monday through Friday. Times are estimated on the basis of a single crew for each utility. Any times and dates mentioned are **estimates only** and are dependent upon favorable weather, working conditions, and freedom from emergencies. The Contractor shall have no claim against the Department if they are exceeded.

Utility Specific Information:

AERIAL

Charter Communications has facilities within the project limits. No utility conflicts are anticipated within the scope of the work planned for this project. Should any arise, the project Resident and the utility must be contacted as soon as possible.

SUBSURFACE

GoNet Speed has underground facilities within the project limits. No utility conflicts are anticipated within the scope of the work planned for this project. Should any arise, the project Resident and the GoNet Speed must be contacted as soon as possible.

RAILROAD

CSX Railways operates an active line under Bridge #1459 & #5816 running beside the Old County Road. Arrangements with the railroad have been made. For flagging arrangement and **Protection of Railroad Traffic and Structures** see **Fully Executed 06-06-2024- ME0040 - 027184.20-CSX Construction Agreement.** No conflicts with CSX are anticipated within the scope of the work planned for this project. Should any arise, the project Resident and CSX must be contacted as soon as possible.

MAINTAINING UTILITY LOCATION MARKINGS

The Contractor will be responsible for maintaining the buried utility location markings following the initial locating by the appropriate utility or their designated representative.

UTILITY SIGNING

Any utility working within the construction limits of this project shall ensure that the traveling public is adequately protected at all times. All work areas shall be signed, lighted, and traffic flaggers employed as determined by field conditions. All traffic controls shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, as issued by the Federal Highway Administration.

Town: Waterville
WIN: 27184.20
Br #1457, #1458, #1459, #5816, #5817
June 3, 2024

SPECIAL PROVISION
SECTION 105
General Scope of Work
(Environmental Requirements)

III. Special Conditions:

1. No in-water work is permitted at any time.
2. MaineDOT ENV Office will attend a preconstruction meeting and discuss potential presence of endangered bats.
3. Endangered Species - Northern Long-Eared Bats are not expected to be present at the project location. If the Contractor witnesses a bat (dead or alive), any activities that may injure any live bats must cease immediately, and the Contractor shall contact Justin Sweitzer of the MaineDOT Environmental Office (207-441-0651) for further coordination. MaineDOT shall coordinate the collection of dead or injured bats.
4. Migratory Birds - If the Contractor observes an active bird nest within the project limits, any activities that may disturb the nest or injure birds (nesting adults, chicks, eggs) must cease immediately, and the Contractor shall contact Nick Koltai of MaineDOT Environmental Office (207-557-3471) for further coordination.

SPECIAL PROVISION
SECTION 105
GENERAL SCOPE OF WORK
(Cooperation Between Contractors)

It is hereby brought to the Contractor's attention that the Department has awarded and plans to award contracts adjacent to the limits of this contract, which may be in progress simultaneously. Specifically, the Department intends to award work under WIN 027184.10 on I-95 Southbound between Fairfield and Benton (Bridge #1455, #1456, and #5999). MaineDOT Maintenance & Operations may have contractually obligated work, as well as routine maintenance activities being conducted within and in close proximity of the limits for this project.

The Contractor shall cooperate with other Contractors at all times and provide project access as necessary and as directed by the Resident.

The Contractor will coordinate all activities including traffic control with others to ensure safe travel for motorists. This shall be specifically addressed within the Contractors Traffic Control Plan.

SPECIAL PROVISION
SECTION 105
GENERAL SCOPE OF WORK
(Traffic Control and Management)

1. The contractor shall plan operations so that the Resident will have sufficient advance notification to provide the necessary inspection and testing. Sufficient notification will be considered 48 hours.

2. The contractor will provide the Resident with a 48-hour written notice before beginning night work. After receiving this notice, no work shall be allowed for 48 hours. Once work has been completed, the contractor will provide the same notice to return to day work.

3. Lane widths along I-95 shall be maintained at not less than 12 feet wide.

4. There shall be a minimum of one foot (1') offset from the travel lane to any barrier, guardrail, or obstruction unless otherwise specified. This offset shall be applied to the left and right sides of all travel lanes.

5. Shoulder closures will not be permitted while the opposite lane is closed.

6. The Contractor will be required to request crossover permits for utilization of the crossovers for Contractor's staff and have them issued prior to using crossovers. All crossover use shall be addressed in the Contractor's traffic control plan. All crossover use shall be monitored during construction and continued use shall at the discretion of the Department.

   Interstate Crossovers may be used for storage of equipment and materials at the discretion of the Department. No equipment or materials shall be stored within 30 feet of the edge of Interstate travel-way and emergency vehicle access must be maintained at all times.

   Interstate Crossovers shall not be allowed to be utilized to change direction, unless both passing lanes are closed simultaneously.

7. The work zone speed limit along I-95 shall be 55 MPH during any lane closure. Existing speed limit signs shall be covered when work zone speed limit is in use. All reduced work zone speeds shall be covered or removed when lane closures are removed.

SPECIAL PROVISION
SECTION 107
TIME
(Incentives, Supplemental Liquidated Damages, and Completion Date)

For all Work associated with this Contract, the following applies:

Daytime lane closures are allowed from Monday April 7, 2025 through Thursday May 22, 2025 and Wednesday September 3, 2025 through Friday October 31, 2025. Nighttime Lane closures between the hours of 7:00 PM and 7:00 AM are allowed at all times unless otherwise specified herein.

During periods of allowed lane closures, the Contractor Shall maintain a minimum 12' travel lane with two 1' shoulders for each direction of traffic.

All four lanes and shoulders shall be open for traffic during the following holiday periods:

- Memorial Day Weekend: 7:00 AM Friday May 23, 2025 to 1:00 AM Tuesday May 27, 2025;
- July 4th: 7:00 AM Thursday July 3, 2025 to 7:00 PM Sunday July 6, 2025;
- Labor Day Weekend: 6:00 AM Friday August 29, 2025 to 1:00 AM Tuesday September 2, 2025;
- Veteran's Day: 7:00 AM Friday November 7, 2025 to 1:00 AM Tuesday November 12, 2025;
- Thanksgiving: 7:00 AM Wednesday November 26, 2025 to 7:00 PM Sunday November 30, 2025.

The Contractor will be assessed Supplemental Liquidation Damages for each lane that remains closed after the specified lane opening time, or after the allowed bound closure period, as specified herein, as follows:

Time After Specified Lane Opening Time	Incremental Supplemental Liquidated Damage	Cumulative Supplemental Liquidated Damage
Zero to 15 Minutes	$1,500	$1,500
15 Minutes to 30 Minutes	$5,000	$6,500
31 Minutes to 45 Minutes	$7,500	$14,000
46 Minutes to 60 Minutes *	$10,000	$24,000

* After 60 minutes, an additional assessment of $2,500.00 for each 15-minute time period, or portion thereof, will be made.

Applicable charges will be deducted from any monies due the Contractor for Work performed. Deduction will be based on the applicable rate for any and all closures whether Work is being performed or not. This assessment of Supplemental Liquidated Damages will be in addition to the Liquidated Damages specified in Section 107 of the Standard Specification.

Contract Completion Date is December 12th, 2025.

For Work associated with I-95 NB & SB Bridges over County Road (Bridge #5816 & #1459) and I-95 NB & SB Bridges over Messalonskee Stream (Bridge #5817 & #1458), the following applies:

The Contractor shall be permitted to close one bound of I-95 and detour traffic onto the median crossovers with one lane of northbound traffic and one lane of southbound traffic utilizing the opposing I-95 bound. The Contractor shall not detour traffic onto the median crossovers between November 8th, 2024, and April 7th, 2025.

The Contractor will be allowed to close each bound of I-95 (a bound being defined as either the northbound portion of I-95 or the southbound portion of I-95) for a maximum of thirty-five (35) consecutive Calendar Days. Each bound closure period begins when one lane of any bridge is closed to through traffic on a given bound outside of the allowable nighttime closure periods. The bound closure period shall be considered complete when all four lanes of I-95 are open to traffic without restrictions and all Work on all bridges on the bound where work was being performed is complete, as determined by the Resident. Once the Resident determines that the bound closure is complete, no daytime lane closures will be allowed for Work on that bound.

An incentive of fifteen thousand ($15,000) U.S. dollars will be provided for each Calendar Day that an I-95 bound closure is completed prior to the allowed 35 Calendar Day bound closure period. This incentive shall apply to each of the bound closures. The maximum incentive shall be capped at three hundred thousand ($300,000) U.S. dollars for the entire Contract.

For Work associated with I-95 SB Bridge over Main Street (Bridge #1457), the following applies:

Lane closures between the hours of 7:00 AM and 7:00 PM are not permitted.

SPECIAL PROVISION
SECTION 202
REMOVING STRUCTURES AND OBSTRUCTIONS
(Shoulder Rumble Strips)

202.01 Description

This work shall consist of milling a pattern onto highway shoulders at the spacing, offset, width, and depth as shown in the Contract Documents to match the pre-existing and adjacent rumble strips. Rumble strips shall not be placed across ramp openings, crossover openings, or on bridges.

The following Subsections are added:

202.021 Removing Materials

The bituminous material shall be removed by a cold milling machine capable of removing the pavement to the required depth and width. The machine must be adjustable to grind or plane on various cross-slopes. Salvage and disposal of bituminous material shall be in accordance with Section 203.

202.022 Equipment

The equipment shall be a cold milling machine or a cold planning machine specially manufactured for rumble strips. This machine shall be capable of cutting 1200 rumble strips per hour of operation. The Contractor will perform a test section prior to rumble strip installation and at any time as directed by the Resident. The test section will be done to ensure that the machine is capable of milling the rumble strips in accordance with these specifications and the Plans.

202.07 Method of Measurement

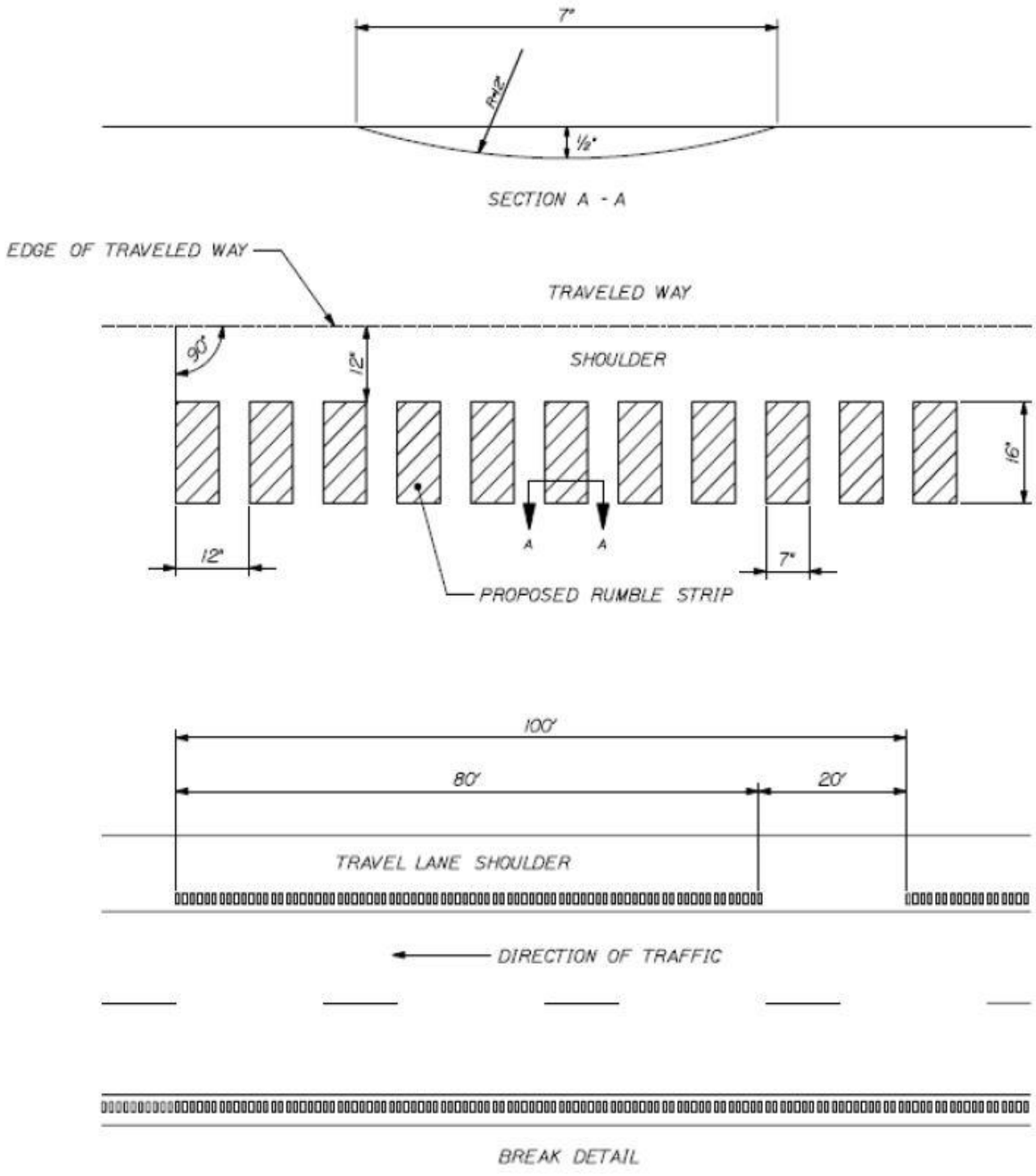
Rumble strips will be measured by the linear foot longitudinally along the edge of the travelway. For rumble strips that are broken at regular intervals to permit emergency stopping on shoulders for motorcycles, the length measured for payment shall include the full running length including the regular breaks. Breaks in rumble strip installation for acceleration lanes, deceleration lanes, and crossovers will not be included in the length measured for payment.

202.08 Basis of Payment

The accepted quantity of rumble strips will be paid for at the unit price bid per linear foot which price will be full compensation for removing and salvaging the bituminous material and for all labor, equipment, tools, and incidentals necessary to complete this work.

Payment will be made under:

Pay Item		Pay Unit
202.205	Rumble Strips – Shoulder	Linear Foot



NOTES:

1. SHOULDER RUMBLE STRIPS SHALL BE PLACED ON THE MEDIAN AND OUTSIDE SHOULDER AS SHOWN IN THE ABOVE DETAIL.
2. ON THE OUTSIDE SHOULDER, THE RUMBLE STRIP PLACEMENT SHALL BE BROKEN FOR A DISTANCE OF 20 FT FOR EVERY 80 FT PLACED.

SHOULDER RUMBLE STRIP DETAIL - INTERSTATE

SPECIAL PROVISION
SECTION 202
REMOVING STRUCTURES AND OBSTRUCTIONS
(Rumble Strips, Fill)

202.01 Description: The following paragraph is added.

This work shall consist of grinding existing rumble strip locations to a depth of 1.5 inches, coating vertical and horizontal surfaces with bituminous tack coat, and installing 1.5 inches of hot mix asphalt, 9.5 mm over the entire milled area. Locations and lengths of removal shall be shown on the Plans or as approved by the Resident.

The following Subsections are added:

202.011 Materials. Grinding shall be done in accordance with Section 202. Bituminous tack coat shall conform to Section 409.

Hot mix asphalt, 9.5 mm shall conform to Section 401.

202.025 General. Existing rumble strips are approximately 16 inches long, seven inches wide, ½-inch deep, and spaced approximately every five inches.

202.07 Method of Measurement: The following paragraph is added.

Rumble Strips, Fill will be measured by the linear foot ground, filled, and accepted. Measurement shall be parallel to the adjacent pavement marking.

202.08 Basis of Payment: The following paragraph is added.

The accepted quantity of Rumble Strips, Fill will be paid for at the Contract unit price per linear foot which includes all grinding, bituminous tack coat, pavement, labor, equipment, tools, and incidentals necessary to complete this work.

Payment will be made under:

Pay Item		Pay Unit
202.207	Rumble Strips, Fill	Linear Foot

SPECIAL PROVISION
SECTION 401 - HOT MIX ASPHALT PAVEMENT
(HMA with Fine Micro-Deval Requirement)

The following subsections of the most current version of Specification 401 – Hot Mix Asphalt Pavements have been revised and amended by the following:

401.01 Description The Contractor shall compose Hot Mix Asphalt (HMA) Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. If denoted in Special Provision 403 - Hot Mix Asphalt Pavement, the mixtures shall meet the additional aggregate requirements of this special provision.

401.02 Materials Materials shall meet the requirements specified in Section 700 – Materials, unless otherwise revised in this special provision:

Aggregates for HMA Pavement	703.07
HMA Mixture Composition	703.09

The HMA blend, minus any RAP used, shall have a Fine Micro-Deval value of 15.0 or less as determined by weighted average of individual fine aggregate source values determined through ASTM D7428.

SPECIAL PROVISION
SECTION 401
HOT MIX ASPHALT PAVEMENTS
(HMA – Highly Modified Asphalt Pavement)

The Special Provision 400 – Pavements; Section 401 – Hot Mix Asphalt Pavements; the following subsections have been modified with the following:

Description The Contractor shall furnish and place one or more courses of Highly Modified Asphalt Pavement (HiMAP) on an approved base in accordance with the contract documents and in reasonably close conformity with the lines, grades, thicknesses and typical cross sections shown on the plans or established. The Department will accept this work under Quality Assurance provisions, in accordance with these specifications and the requirements of Section 106 – Quality, the provisions of AASHTO M 323 except where otherwise noted in sections 401 and 703 of these specifications, and the MaineDOT Policies and Procedures for HMA Sampling and Testing. The Highly Modified Asphalt Pavement shall meet all of the Materials, Seasonal Limitations, Equipment, and Construction requirements of Special Provision Section 401, with the following additions and changes.

401.03 Composition of Mixtures The specimens shall be prepared in accordance with AASHTO M323 and R35. The Contractor shall not use RAP in the HiMAP mixture at any percentage.
The mix design will satisfy the following criteria:

TABLE 1: HiMAP VOLUMETRIC DESIGN CRITERIA

Property		**Criteria**
Required Density (Percent of Gmm)	$N_{initial}$	≤89.0
	N_{design}	97.0
	N_{max}	≤99.0
Voids in Mineral Aggregates (VMA)		15% minimum
Voids Filled with Binder (VFB)		65-85%
Fines/Effective Binder Ratio		0.5-1.1
HWT, Rut Depth (20,000 passes) @ 50°C		12.5mm maximum
HWT, Stripping Inflection Point (SIP)		15,000 minimum

401.031 Hamburg Wheel Tracker (HWT) Prior to the test strip, the Contractor shall provide the Department with **four boxes** of the proposed plant or lab produced asphalt mixture for HWT approval. The mixture will be tested for rutting and moisture sensitivity in the Hamburg Wheel Tracker according to AASHTO T324, "Hamburg Wheel-Track Testing of Hot Mix Asphalt (HMA)." If the sample meets the requirements of Table 1, an approved JMF will be forwarded to the Contractor with a comment referencing the passing HWT reference number for use on the test strip. The Department shall provide final approval of the JMF based on the results of the Test Strip. The Department will have five business days from receipt of the sample at the Central Laboratory to process, test, and report the Hamburg Wheel Tracker sample. The first day's production shall be monitored, and the approval may be withdrawn if the mixture exhibits undesirable characteristics such as checking, shoving or displacement.

401.032 Warm Mix Technology The HiMAP shall be modified using an approved Warm-Mix Asphalt (WMA) additive that may reduce compactive effort and emissions. No WMA foaming technology will be permitted which requires the mechanical injection of steam or water into the liquid asphalt. The WMA additive must be compatible with polyphosphoric acid modified and polymer modified asphalts. The WMA additive shall be introduced in accordance with the Manufacturer's dosing rates and approved blending methods.

401.04 Temperature Requirements After the JMF is established, the temperatures of the mixture shall conform to the following tolerances unless otherwise authorized by the Department:

In the truck at the mixing plant – allowable range 290° to 340°F
At the Paver – allowable range 290° to 340°F

401.05 Performance Graded Asphalt Binder The Performance Graded Asphalt Binder (PGAB) shall comply with AASHTO M 332 and R 92 and have a PG Grading of **PG 76E-28** with a minimum 6% SBS Polymer. The Multiple Stress Creep Recovery (MSCR) shall have a $J_{nr}3.2$ maximum value of 0.1 kPa^{-1} when tested according to AASHTO T 350. The minimum MSCR % recovery at 3.2 kPa shall be 90%. The MSCR test for Jnr and % recovery shall be run at 76°C. The viscosity shall be less than or equal to 3.0 Pa-s, however the Department may increase this limit to 5.0 Pa-s if the binder supplier and contractor agree that the binder is suitably workable.

401.10 Rollers Section 401.10 shall apply, with the following exceptions; a Pneumatic roller will not be required. A 3-5 ton dual drum vibratory shall be required to replace the pneumatic roller in the required roller train, and aid in compaction in areas inaccessible to larger rollers.

401.19 Quality Control - Method A, B, C & D The Contractor shall have a testing lab at the plant site, equipped with all testing equipment necessary to complete the tests in Table 2. The Contractor shall locate an approved Gyratory Compactor at the plant testing lab. The Contractor shall generate QC sampling random numbers for each approved mix design. A copy of the random numbers shall be emailed to the QC.mainedot@maine.gov email address and remain on-file (in print) and be available for inspection at the QC laboratory. The Contractor shall sample, test, and evaluate Hot Mix Asphalt Pavement in accordance with the following minimum frequencies per each approved mix design:

TABLE 2: MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	**Frequency**	**Test Method**
Temperature of mix	6 per day at street and plant	-
Temperature of mat	4 per day	-
%TMD (Surface)	1 per 125 ton	AASHTO T 355 or AASHTO T 343
%TMD (Base)	1 per 250 ton	AASHTO T 355 or AASHTO T 343
Fines / Effective Binder	1 per 500 ton	AASHTO T 312
Gradation	1 per 500 ton	AASHTO T 30
PGAB content	1 per 500 ton	AASHTO T164 or AASHTO T 308
Voids at N_{design}	1 per 500 ton	AASHTO T 312
Voids in Mineral Aggregate at N_{design}	1 per 500 ton	AASHTO T 312
Rice Specific Gravity	1 per 500 ton	AASHTO T 209
Coarse Aggregate Angularity	1 per 5,000 ton	ASTM D5821
Flat and Elongated Particles	1 Per 5,000 ton	ASTM D4791
Fine Aggregate Angularity	1 Per 5,000 ton	AASHTO T 304
Hamburg Wheel Tracker	1 Per 4,000 ton and at least once per Acceptance Lot	AASHTO T 324

The Contractor shall monitor plant production on each approved mix design using running average of three control charts as specified in Section 106 - Quality. Control limits shall be as noted in Table 3 below. The UCL and LCL, shall not exceed the allowable gradation control points for the particular type of mixture as outlined in Table 1 of Section 703.0

Hamburg Wheel Tracker (HWT) The project specific QCP shall address the sampling, transport, and testing of Hamburg Wheel Tracker QC samples and what potential steps will be taken if QC samples do not meet the requirements in Table 1. The project specific QCP shall also contain a sample Hamburg Wheel Tracker test report for approval. The Contractor shall sample and test HMA Pavement in the Hamburg Wheel Tracker according to AASHTO T324 in accordance with the minimum frequencies listed in Table 2.

The Contractor shall sample the HMA on the first day of production and test the sample in the Hamburg Wheel Tracker according to AASHTO T324. This sample will not count towards the minimum quality control frequency specified in Table 2. The Contractor shall submit all Hamburg Wheel Tracker test reports in writing, signed by the appropriate technician and present them to the Department within ten working days of initial sampling, except when otherwise noted in the project specific QCP due to local restrictions. The Contractor shall make the raw Hamburg Wheel Tracker data from QC samples available to the Department upon request. If a QC sample fails to meet the criteria in Table 1, the Contractor will be required to submit a corrective action letter to the Resident, Materials Engineer, Pavement Quality Manager, and Pavement Quality Engineer by the end of the following working day with the proposed changes to bring the mixture back into compliance. The Department will respond and either accept or reject the Contractor's proposed corrective action by the end of the following working day from when the letter was received.

401.20 Acceptance Method The HiMAP will be evaluated by the acceptance limits specified in Table 3 and in accordance with Section 106.6 Acceptance, (1) Method A as specified Section 401.20 - Quality Assurance Methods A and C of the most recent Special Provision 400 - Pavements.

The Department will sample the HiMAP on the first day of production and at the acceptance frequencies specified in Table 2 to verify the compliance with the HWT. For all QA samples identified as a HWT sample, the Department will collect four additional boxes of the HMA mixture to verify compliance with the HWT requirements. The minimum sampling shall be as specified in Table 3A.

If an acceptance sample fails to meet the criteria in Table 1, the Contractor will be required cease production and submit a corrective action letter to the Resident, Materials Engineer, Pavement Quality Manager, and Pavement Quality Engineer by the end of the following working day with the proposed changes to bring the mixture back into compliance. Failure to do so will be treated as a second incident under 106.4.6 QCP Non-compliance.

TABLE 3: ACCEPTANCE LIMITS

Property	**USL and LSL**
Passing 4.75 mm and larger sieves	Target +/-7%
Passing 2.36 mm to 1.18 mm sieves	Target +/-4%
Passing 0.60 mm	Target +/-3%
Passing 0.30 mm to 0.075 mm sieve	Target +/-2%
PGAB Content	Target +/-0.4%
Voids at N_{design}	3.0% +/- 1.5%
Fines to Effective Binder	0.8 +/-0.3
Voids in the Mineral Aggregate	LSL from Table 1
Voids Filled with Binder	401.03 Composition of Mixtures Table 1 values plus a 4% production tolerance for USL only
% TMD (In place density)	94.5% +/- 2.5%

TABLE 3A: MINIMUM HWT ACCEPTANCE FREQUENCIES

Test or Action	Frequency	Test Method
Hamburg Wheel Tracker	1 per 4,000 ton and at least once per Acceptance Lot	AASHTO T 324

HWT Pay Adjustment For Hamburg Wheel Tracker, if the mix is within the tolerances listed in Table 1, the Department will pay the contract unit price, otherwise pay adjustments as shown in Table 4 shall be applied to the quantity of mix represented by the test.

TABLE 4: HWT PAY ADJUSTMENT

Number of Passes	Pay Adjustment
< 20,000	-1.0% for every 1000 passes below target

A pay adjustment will not be applied to the HWT acceptance sample taken within the test strip or within the first lot on the first day of production per JMF.

Test Strip A test strip of a minimum 60 tons placed at a nominal depth of 1 ¾ inch, full lane width, shall be required. The Department shall take at a minimum a single sample consisting of eight boxes and three cores stratified over the length of the test strip. The mixture will be evaluated under the Method B and HWT testing requirements. The exact location of the test strip will be identified by the Department. Prior to placement of the test strip, a leveling course (Item 403.211) shall be placed at the chosen location. A fog coat of Item 409.15, Bituminous Tack Coat, shall be applied to the level course prior to the placement of the HMA surface course, payment to be made under the 409.15 pay item. The test strip will be excluded from the remainder of the projects' QA analysis. The Contractor shall notify the Department at least 48 hours in advance of placing the test strip. The test strip is intended to allow the Contractor to establish a method of compaction, adjust plant settings prior to mainline plant production, and obtain a HWT and production sample for the final approval of the JMF.

403.05 Basis of Payment The accepted quantities of HiMAP will be paid for at the contract unit price per ton for the mixture in place.

Payments will be made under the appropriate mixture type used:

Pay Item		Pay Unit
403.2084	12.5mm Highly Modified Asphalt Pavement (HiMAP)	Ton

SPECIAL PROVISION
SECTION 403
HOT MIX ASPHALT PAVEMENT

Desc. Of Course	Grad Design.	Item Number	Total Thick	No. Of Layers	Comp. Notes
		3" – Bridge Decks			
Wearing	12.5 mm	403.2084	3"	2	2,5,8,23,24,25,26,30
		3" – I-95 Travel Way & Shoulders – Mill & Overlay			
Wearing	12.5 mm	403.2084	3"	2	2,5,8,23,24,25,26
		¾" - Cross Overs – Thin Lift Overlay			
Wearing	9. 5mm	403.210	3/4"	1	4,8,20,30
		Variable – Shim – As Directed			
Shim	9.5 mm	403.211	varies		4,20,30
		4" – Temporary Pavement			
Temp. Surface	12.5 mm	461.131	4"	2	25

COMPLEMENTARY NOTES

2. The required PGAB shall be a storage-stable, homogeneous, polymer modified asphalt binder that meets **PG 76E-28** grading requirements in AASHTO M 332. All polymer modified asphalt grades utilized on the Project shall be treated with an approved liquid anti-strip. PG binders shall be treated either at the asphalt source terminal with the required dose rate on the delivery documentation, or at the hot mix asphalt plant utilizing a system integrated with the plants controls that will introduce a minimum 0.50 percent anti-strip by weight of asphalt binder used unless a rate is otherwise recommended by the anti-strip manufacturer. The PGAB and anti-strip blend shall meet the **PG 76E-28** requirements. The Contractor shall provide supporting test data showing the PGAB and anti-strip blend meet the required criteria.
4. The aggregate qualities shall meet the design traffic level of 3 to <10 million ESALS for mix placed under this contract. The design, verification, Quality Control, and Acceptance tests for this mix will be performed at **65 gyrations**.
5. The design traffic level for mix placed shall be >10 million ESALS. The design, verification, Quality Control, and Acceptance tests for this mix will be performed at **65 gyrations**.
8. Section 106.6 Acceptance, (2) **Method B** as specified Section 401.21 - Quality Assurance Methods A and B.
20. The combined aggregate gradation required for this item shall be classified as a 9.5mm Thin Lift Mixture (TLM) mixture, using the Aggregate Gradation Control Points as defined in 703.09.
23. The mixture shall meet the Hamburg Wheel Tracker requirements as specified in Special Provision 400 – HMA – Highly Modified Asphalt Pavement (HiMAP).
24. See Special Provision 401 - HMA with Fine Micro-Deval Requirement for project specifics.
25. See Special Provision 461 - Temporary Pavement for project specifics.
26. A wedge joint shall be used on all longitudinal joints between lanes.

30. The incentive/disincentive provisions for density shall not apply. Rollers shall meet the requirements of this special provision. The use of an oscillating steel roller shall be required to compact all mixtures pavements placed on bridge decks.

Tack Coat

A tack coat of emulsified asphalt, RS-1, RS-1h, CRS-1 or CRS-1h, Item 409.15 shall be applied to any existing pavement at a rate of approximately 0.030 gal/yd², and on milled pavement approximately 0.05 gal/yd² prior to placing a new course. A fog coat of emulsified asphalt shall be applied between shim /base courses and surface course as well as to any bridge membrane prior to the placement of HMA layers at a rate not to exceed 0.030 gal/yd². Tack used will be **paid for at the contract unit price** for Item 409.15 Bituminous Tack Coat

SPECIAL PROVISION
SECTION 461
TEMPORARY PAVEMENT

Description

This work shall consist of furnishing all labor, materials and equipment, for the manufacturing, installation and removal of all Temporary Pavement in accordance with these specifications, Special Provision 403 Hot Mix Asphalt, and the Plans.

For Temporary Traveled Ways, pavement shall meet all mix design requirements of a 12.5 mm surface mix for the top 1½ inches, and a 12.5 mm base mix for the remaining 2½ inches.

For Temporary Pavement on Bridge Decks, pavement shall meet all mix design requirements of a 12.5 mm surface mix for the required 2 inches.

For Temporary Sidewalks and Pedestrian Access, pavement shall meet all mix design requirements of a 9.5 mm surface mix for the required 2 inches.

Acceptance

This work shall not be eligible for mix or density incentive/disincentive.

The Department will accept or reject any HMA based on a **visual basis**, either prior to its use, during placement, or in its final disposition.

Method of Measurement

This work will be measured for payment by the Ton, complete in place and accepted.

Basis of Payment

The work shall be paid for at the contract Ton price for the manufacturing, installation and removal of all Temporary Pavement.

Payment will be made under:

Pay Item		Pay Unit
461.131	Temporary Pavement	Ton

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(Polyester Polymer Concrete)

502.01 Description. The following sentence is added:

This work shall consist of furnishing and placing a polyester polymer concrete with High Molecular Weight Methacrylate (HMWM) resin primer on concrete surfaces where indicated in the Contract Documents. The work shall include the preparation of receiving surfaces.

502.03 Materials. The following paragraphs are added:

The polyester concrete shall consist of polyester resin binder and aggregates with a compatible primer meeting the component and composite material properties specified. All components shall be supplied collectively through the same provider, qualified as defined herein, referred to as the System Provider.

1. Primer. The prepared surface shall receive a wax-free low odor, high molecular weight methacrylate (HMWM) primer consisting of a resin, initiator, and promotor and conforming to the following:

High Molecular Weight Methacrylate (HMWM) Primer Resin		
Property	Requirement	Test Method
Volatile Content*	30%, maximum	ASTM D 2369
Viscosity* (Brookfield RVT with UL adapter, 50 RPM at 77°F)	25 cps, maximum	ASTM D 2196
Specific Gravity* (at 77°F)	0.90, minimum	ASTM D 1475
Flash Point*	180°F, minimum	ASTM D 3278
Vapor Pressure* (at 77°F)	1.0 mm Hg, maximum	ASTM D 323
PCC Saturated Surface-Dry Bond Strength, with primer** (at 24 hours and 70 ± 1°F)	500 psi, minimum	CT 551, part 5

*Tested prior to adding initiator.
**Initiated polyester concrete tested at 12% resin content by weight of the dry aggregates.

The prime coat promoter/initiator shall consist of a metal drier and peroxide. If mixed directly, they will create a violent exothermic reaction. Therefore, during shipping and storage, the containers of the metal drier and the peroxide shall be stored in a manner that will not allow leakage or spillage from one material to contact the containers or material of the other.

2. Aggregate. Aggregate for polyester concrete shall meet the following properties:
   a. Aggregate retained on the #8 sieve shall have a maximum of 45% crushed particles when

tested in accordance with AASHTO Test Method T335.

b. Fine aggregate shall consist of natural sand only.
c. Weighted average aggregate absorption shall not exceed 1.0% as determined by AASHTO Test Methods T84 and T85.
d. At the time of mixing with the resin, the moisture content of the aggregate, as determined by AASHTO Test Method T255, shall not exceed one half of the aggregate absorption.
e. Aggregate shall have a minimum Mohs hardness of 7.
f. Aggregate shall meet the following gradation:

Aggregate Gradation	
Sieve Size	Percent Passing
3/8”	100
No. 4	62-85
No. 8	45-67
No. 16	29-50
No. 30	16-36
No. 50	5-20
No. 100	0-7
No. 200	0-3

3. Polyester Resin Binder. The polyester binder resin shall have the following properties:
   a. Be an unsaturated isophthalic polyester-styrene co-polymer suitable for a polyester concrete mixture with a resin content of 12% ± 1% of the weight of the dry aggregate.
   b. Contain at least 1% by weight gamma-methacryloxypropyltrimethoxysilane, an organosilane ester silane coupler.
   c. Be used with a promoter that is compatible with suitable methyl ethyl ketone peroxide and cumene hydroperoxide initiators.
   d. Shall meet the following material properties:

	Polyester Resin Binder	
Property	Requirement	Test Method
Viscosity* (RVT No. 1 spindle, 20 RPM at 77°F)	75-200 cps	ASTM D 2196
Specific Gravity* (at 77°F)	1.05 to 1.10	ASTM D 1475
Styrene Content*	40-50%, by weight	ASTM D 2369
Silane Coupler*	1.0%, minimum by weight of polyester resins	NMR Spectrum
Elongation	35%, minimum (Type I specimen, thickness 0.25± 0.03” at Rate = 0.45 inch/minute)	ASTM D 638
	Sample Conditioning: 18/25/50+5/70	ASTM D 618
Tensile Strength	2,500 psi, minimum (Type I specimen, thickness 0.25± 0.03” at Rate = 0.45 inch/minute)	ASTM D 638
	Sample Conditioning: 18/25/50+5/70	ASTM D 618

*Tested prior to adding initiator.

4. Polyester Concrete. The polyester concrete composite mixture shall meet the following properties:

Polyester Concrete Composite Mixture		
Property	Requirement	Test Method
PCC Saturated-Surface Dry Bond Strength, without primer* (at 24 hours and 70 ± 1°F)	500 psi, minimum	CT 551
Abrasion Resistance	2g weight loss, maximum	CT 550
Modulus of Elasticity	1,000 to 2,000 ksi	ASTM C 469

*Initiated polyester concrete mixture tested at 12% resin content by weight of dry aggregates.

5. Packaging and Shipment. A Safety Data Sheet shall be furnished prior to use for each shipment of polyester resin binder and high molecular weight methacrylate resin. Polyester resin binder and primer resin shall bear the System Provider's label specifying lot/batch number, brand name and quantity. In addition, the mixing ratio shall be provided to the Contractor by the System Provider prior to shipment.

6. Storage of Materials. All materials shall be stored in a cool, dry location and in their original containers in accordance with the System Provider's recommendation to ensure their preservation until used in the work. The shelf life for liquid materials stored out of direct sunlight and at temperatures 80 °F and below shall be at least twelve (12) months. All aggregates shall be stored in a clean, dry location away from moisture. Applicable fire codes may require special storage facilities for some components of the Polyester Polymer Concrete system.

7. Basis of Acceptance. Project acceptance of the polyester concrete materials will be based on the following:

a. Delivery of the materials to the project site shall be in acceptable containers bearing all the label information as required in 6. Packaging and Shipment.
b. System Provider certifications and written instructions submitted by the Contractor to the Resident thirty (30) days prior to the placement including the following information:
    i. Materials: statement that the primer, aggregate and polyester binder are compatible with one another and meet the material requirements found under Materials, 1-3.
    ii. Experience: documented evidence of having successfully supplied a complete polyester polymer concrete system meeting this specification on at least five (5) projects of similar size and scope within the last five (5) years.
    iii. Technical Representative: having successfully provided technical support on at least two (2) projects of similar size and scope within the last five (5) years.
c. Approval by the Department is based on conformance with the Material requirements above.

Construction Details:

1. General. A System Provider's competent technical representative shall be made available for a minimum of three (3) working days to make recommendations to facilitate the header

installation and trial application.

During surface preparation and application, precaution shall be taken to assure that traffic is protected from rebound, dust and construction activities. Appropriate shielding shall be provided as required and directed by the Resident. The Contractor shall provide suitable coverings (e.g. heavy duty drop cloths) to protect all exposed areas not to be overlaid, such as curbs, sidewalks, parapets, etc. All damage or defacement resulting from this application shall be cleaned and or repaired to the Resident's satisfaction at no additional cost to the Department.

2. Trial Application. Prior to constructing the header, one or more trial applications shall be placed on a simulated prepared substrate to demonstrate proper initial set time and the effectiveness of the surface preparation, mixing, placing and finishing equipment proposed. Each trial application shall be at least 10 feet long and at the planned width and a typical header thickness. The location(s) on the bridge of the trial applications shall be approved by the Resident.

If for any reason the trial application fails to meet specification, the Contractor shall remove the failed trial application and reinstall the trial application at no additional cost to the Department until satisfactory results are obtained.

The number of trial applications required shall be as many as necessary for the Contractor to demonstrate the ability to construct an acceptable trial header section and competency to perform the work. The Contractor, System Provider, and/or proposed equipment/techniques may be rejected by the Resident if not shown to be acceptable after three (3) failed trial applications.

The vertical axis pull test shall be performed twenty-four (24) hours after the placement of the trial application in accordance with ASTM C 1583 to assure that the concrete adheres to the prepared surface. The test result shall be the average of two (2) successful tests. Test cores shall be drilled through the concrete and into the substrate a minimum of 0.25". The minimum tensile pull strength on normal weight concrete substrates shall be 250 psi. An acceptable test will demonstrate that the bond strength is sufficient by producing a concrete subsurface failure area greater than 50% of the test area.

3. Surface Preparation. All surfaces that will be in contact with the headers shall be prepared by shot blasting, or a similar approved method, in order to remove all existing grease, slurry, oils, paint, dirt, striping, cure compound, rust, membrane, asphalt, weak surface mortar or any other contaminants that could interfere with the proper adhesion of the system.

Shot blasting shall be done with shot blasting units which include a vacuum to recover spent abrasives. The abrasive shall be steel shot. Magnetic rollers shall be used to remove any spent shot remaining on the concrete after vacuuming. Areas that cannot be accessed by shot blasting may, with the Resident's approval, be cleaned by sand blasting. All contaminants shall be picked up and stored in a vacuum unit, and dust shall not be created during the cleaning operation that will obstruct the view of motorists. Surface preparation shall expose the aggregates within the substrate concrete. Mortar which is sound and firmly bonded to the

coarse aggregate must have open pores to be considered adequate for bonding of polyester polymer concrete.

Cleaning shall not commence until all work involving the repair of the concrete substrate surface has been completed and repair materials have cured. All deck repair material shall be compatible with the polyester polymer concrete to ensure proper bonding and be found on the MaineDOT QPL. Repair materials with magnesium phosphate shall not be used.

Cleaned surfaces shall not be exposed to vehicular traffic unless approved by the Resident. Cleaned concrete substrates that have been contaminated must be cleaned to the satisfaction of the Resident prior to placing the header at no additional cost to the Department.

All steel surfaces that will be in contact with the headers shall be cleaned in accordance with SSPC-SP No. 10, Near-White Blast Cleaning, except that wet blasting methods shall not be allowed.

4. Application. Prior to the primer and headers application, moisture content reading must be ≤ 5.0% using a moisture meter or using ASTM D4263 - Indicating Moisture in Concrete by the Plastic Sheet Method for a minimum of 2 hours. If using ASTM D4263, no visible moisture is considered acceptable. The substrate surface temperature shall be between 50-90°F at the time of primer and Polyester Polymer Concrete placement.

a. Prime Coat.
   Primer shall be mixed and applied in accordance with the System Provider's recommendations. Primer shall be applied within 5 minutes of mixing initiator and resin at a rate of approximately 90-100 ft^2/gal or as otherwise recommended by the System Provider. Primer shall evenly cover all surfaces, including adjacent vertical surface, and any excess shall be removed or spread to meet the recommended application rate. Primer shall be reapplied to any areas that appear visibly dry prior to header placement.

b. Polyester Concrete.
   The polyester concrete shall be mixed and applied in accordance with the System Provider's recommendations. Polyester polymer concrete shall be mixed in either mechanically operated mixers or continuous automated mixers meeting the following requirements:

   i. Employ an auger screw/chute device capable of completely blending catalyzed binder resin and aggregates.
   ii. Employ a plural component pumping system capable of handling polyester binder resin and catalyst, adjustable to maintain proper ratios to achieve set/cure times within the specified limits.
   iii. Be equipped with an automatic metering device that measures and records aggregate and resin volumes. Record volumes at least every 5 minutes, including time and date. Submit recorded volumes at the end of shift.
   iv. Have a visible readout gage that displays volumes of aggregate and resin being recorded. Produce a satisfactory mix consistently during the entire

application process.

v. Be calibrated per Caltrans California Test CT 109 or similar. Submit current certificate of calibration to the Resident.

Portable mechanically operated mixers of appropriate size may be used as recommended by the System Provider and approved by the Resident.

Roller screeds will not be permitted.

Polyester concrete shall be placed no sooner than 15 minutes and no later than 2 hours after the beginning of the application of the primer. The polyester concrete shall be placed prior to gelling or within 15 minutes after the addition of the initiator, whichever occurs first, or as recommended by the System Provider. As determined by the Resident, discard any polyester polymer concrete not placed within this time limit at no additional cost to the Department.

The polyester concrete mixture shall achieve an initial set time between 30 minutes and 90 minutes. For the purposes of this specification, initial set is defined as when the in-place polyester concrete cannot be deformed when firmly pressed with a finger. Material not achieving initial set within this time frame shall be removed and replaced at no additional cost to the Department.

The polyester concrete shall be consolidated and finished using placement equipment as defined herein, or similar approved equivalents, to strike off the polyester concrete to the required grade and cross-section as shown in the Plans.

The polyester polymer concrete shall be placed at a profile necessary to meet the desired grade, cross-section, and minimum thickness as shown in the Plans. Termination edges of the header may require application and finishing by hand trowel due to obstructions such as a curb. If the header is not completed within the work period, including if staged construction is used, proper termination of edges and starting from terminated edges shall be as specified by the System Provider and approved by the Resident. Expansion joints, drains, access hatches or other appurtenances on the deck shall be adequately protected and isolated prior to polyester polymer concrete application as approved by the Resident.

c. Curing.
Cure time is dependent on ambient and substrate temperatures and also initiator/accelerator levels used at the time of mixing. The header shall be allowed to cure sufficiently before being subjected to loads or traffic of any nature that may damage the header. The header shall be protected from moisture until cured to a traffic ready state.

d. Waste Management.

Residual material generated during the header work shall be managed in accordance with relevant and applicable sections of Maine Department of Environmental Protection

Solid and Hazardous Waste Regulations. Specific attention shall focus on the proper management of shot blast material, grinding/cutting slurry, residual polyester resin binder and clean-up solvents. These materials cannot be disposed of on site. The Contractor shall submit a waste management plan to the Resident for approval, prior to the removal of waste materials from the site. This plan shall include waste characterization testing required by solid waste management and wastewater treatment facilities, as well as proper storage, transport and disposal methods for the material. The Contractor shall be responsible for all costs associated with waste management, and these costs shall be incidental 520 items.

5. Surface and Thickness Requirements. Variable thickness headers placement may be required to account for variations in substrate profile to meet the desired grade and cross-section as shown in the Plans. Any surfaces which fail to conform to the tolerances defined in Standard Specification Section 502 shall be re-profiled as recommended by the System Provider and approved by the Resident.

If the Resident determines that the minimum thickness has not been attained, an additional layer shall be applied after the header has cured to a traffic ready state in accordance with the "Curing" section of this specification. This layer shall be a minimum of ¼" and shall be applied as recommended by the System Provider and approved by the Resident at no additional cost to the Department.

Any surface defects shall be repaired as recommended by the System Provider and approved by the Resident at no additional cost to the Department. Areas less than 4.0 ft2 shall be ground using a hand grinder. Larger areas and frequency representing more than 20% of the surface shall be ground as recommended by the System Provider and approved by the Resident.

Repair all areas determined by the Resident to be unbonded, uncured, segregated, or damaged at no additional cost to the Department. Surface cracks in sound, bonded polyester polymer concrete header may be filled with properly initiated HMWM primer material.

502.18 Method of Measurement. The following sentence is added:

The polyester polymer concrete headers will not be measured for separately.

502.19 Basis of Payment. The following sentence is added:

Polyester polymer concrete header will be paid as incidental to the 520 Items, which will include all materials, labor, equipment, and incidentals necessary to complete the work including the cost of having the System Provider's representative present as required.

SPECIAL PROVISION
SECTION 510
SPECIAL DETOURS
(Expressway Median Crossover)

510.01 Description: The following paragraph is added.

This work shall consist of the design, construction, maintenance, temporary storage of overburden material, wetland protection, removal, and restoration to pre-existing conditions for the operation of an expressway/freeway median crossover. The expressway/freeway median crossover shall consist of rehabilitation and reuse of the existing Ramp A and Ramp D originally constructed under MaineDOT Contract IM-95-7800(00)E / IM-95-9987(00)E / IM-95-8695(00)E.

510.02 Materials: The following paragraphs are added.

The Contractor shall remove the existing overburden material from the underlying pavement at Ramp A, Ramp B, Ramp C, and Ramp D. The overburden material should be stored within the project area, avoiding placement in wetlands. Overburden material storage shall be either outside of the highway clear zone (assumed to be within 30 feet of the edge of traveled way for both I-95 northbound and I-95 southbound) or protected by positive barrier such as guardrail. At the completion of the overburden removal, the Contractor shall notify the Resident and the Engineer of Record for inspection of the underlying pavement.

The Contractor shall conduct an instrument survey of the median area from the I-95 Northbound travel way to the I-95 Southbound travel way. The survey shall include the area from 500 feet south of each crossover to 500 feet north of each crossover. The survey shall be completed in accordance with MaineDOT standard survey procedures by a Professional Land Surveyor licensed in the State of Maine. The survey shall be the basis for the crossover details in the Contractor's median crossover design.

As part of the Contractor's traffic control plan submission, the Contractor shall indicate the limits for the overburden storage areas. Overburden storage shall be in accordance with the Contractor's approved SEWPCP submission.

510.032 Geometric and Approach Design: Delete this section and replace with the following paragraphs.

The Contractor shall design and submit to the Resident a detailed design of the vertical and horizontal alignment for the proposed rehabilitation of the expressway median crossover. 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 "A Policy on Geometric Design of Highways and Streets" (AKA Green Book) and the FHWA "Manual on Uniform Traffic Control Devices".

a) Design Speed – The design speed of the Median Crossover shall be not less than 55 miles per hour (mph). The posted speed through the work zone shall be 55 mph.

b) Horizontal and Vertical Alignment – Minimum horizontal alignment controls shall be governed by the Green Book for the given design speed. Vertical grades on the cross-over ramps shall not exceed four percent (4%) throughout. Grade changes and superelevation shall be governed by the Green Book for the given design speed.

c) Clear Zone – The median cross-over clear zone protection shall be designed in accordance with the AASHTO Roadside Design Guide using materials that conform to Test Level 3 (TL-3) standards. If materials were manufactured after December 2019, the materials shall conform to the Manual on Assessing Safety Hardware (MASH) TL-3 standards.

d) Approach Embankments – The earth materials used to supplement the approach embankments shall have sufficient strength to maintain stability throughout the duration of the median cross-overs. Overburden materials removed from the existing crossover pavement may be temporarily stored on site along the approach embankments and along the mainline pavement. The overburden materials shall be stored in such a way that erosion of the material will not impact wetlands.

e) Drainage – The Contractor shall provide sufficient materials to protect any existing wetlands while managing and maintaining the existing drainage structures and stormwater from the highway mainline and the median cross-over.

f) Approach Road Surface – The median cross-over ramp road surface shall be paved with a minimum of 3 inches of hot bituminous pavement. Following excavation of the overburden, the Contractor shall provide a minimum of a ¾-inch overlay on the existing crossover pavement.

510.06 Special Detour Construction – Delete the last paragraph and replace with the following.

Prior to the removal of the existing overburden material, the Contractor shall install erosion and sedimentation controls within the overburden storage area. The Contractor shall locate, inspect, and clean out any existing drainage structures and pipes under or adjacent to the cross-over ramps. If any existing drainage pipes show structural damage upon inspection, the damage shall be documented and submitted to the Resident for further action.

Any removal of existing guardrail shall be restored or protected from traffic by the end of the work day. All temporary blunt ends shall include a guardrail terminal unit. If the blunt end is unprotected, the guardrail terminal shall be crash-worthy to TL-3.

When the work is advanced to the point the median cross-overs are no longer needed for

traffic control, the Contractor shall remove the temporary portable barrier, channelizing devices, signs, drums, barricades, and all other temporary traffic control equipment from the project. The Contractor shall restore the median to its pre-Contract state with the stored overburden, supplemented by loam, seed, and mulch to provide a stabilized surface. Any temporary pavement markings shall be removed, previously removed pavement markings shall be re-installed, and rumble strips that have been removed shall be re-installed.

510.08 Method of Measurement Expressway Median Crossover will be paid by the lump sum.

510.09 Basis of Payment The accepted Expressway Median Crossover 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, survey, construction, material removal and storage, rehabilitation, maintenance, partial removal and restoration, and temporary 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 paving not included as a pay item in the contract shall be incidental to this item. The lump sum price also includes 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 both of the Expressway Median Crossovers required for a single direction of travel (i.e. Northbound or Southbound) are acceptable and open to traffic; another 20 percent of the lump sum price will be paid when the Expressway Median Crossovers are no longer required and are closed to traffic; the final 20 percent of the lump sum price will be paid when the Expressway Median Crossovers are removed to the extent required and the area encompassing the crossovers is acceptably restored.

Traffic control devices, temporary erosion control, pavement, and dust control will be paid for in accordance with the applicable Contract items when included in the Contract.

The following pay item is added:

Payment will be made under:

Pay Item		Pay Unit
510.301	Expressway Median Crossover	LS

SPECIAL PROVISION
SECTION 520
EXPANSION DEVICES
(Bridge Joint Modification - Type 3)

Description: This work shall consist of removal, adjustment, repair, and modification as indicated on the plans and in accordance with the Special Provisions and Standard Specifications. The joint steel, keeper bars, and seals shall be the type indicated on the plans and shall meet the material, fabrication, and construction requirements of the relevant Standard Specifications, Standard Details, and Special Provisions.

Concrete deck repairs that extend more than 2 inches below the removal of the header limits shown on the plans, if required, will be measured, and paid under the appropriate 518 pay item. The repair shall be completed per the product's manufacturer's requirements and be from the bottom of the concrete repair to the top of the underside of the PPC header. Concrete repairs that extend less than 2 inches below the header limits shown on the plans will not be measured for payment separately but shall be incidental to the related bridge joint modification pay item.

Materials: Header concrete or pavement removed shall be replaced with Polyester Polymer Concrete meeting the requirements of Special Provision Section 502. Polyester Polymer Concrete shall be placed in accordance with manufacturers recommendations for depth. Where depths exceed manufacturers recommendation the Contractor shall place the Polyester Polymer Concrete in equal lifts. All other concrete removed shall be replaced with material meeting the applicable requirements of Standard Provision Section 518.

The Seals for bridge joint modifications shall be replaced as indicated on the plans and shall meet the material, fabrication, and construction requirements of Section 520 - Expansion Devices - Non-Modular. Expansion Joints and Seals shall be selected from the appropriate MaineDOT Qualified Product List of Bridge Compression Seals and Gland Seals.

The Contractor shall measure, select, and field verify that the joint seals will properly fit the existing extrusions. Joint seal replacements shall be the full width of the bridge deck and extend a minimum of 6" outside the fascia, as shown on the plans.

Construction Requirements: The removal, adjustment, modification, and replacement of bridge joints shall be done in a manner that accommodates maintenance of traffic requirements and shall be coordinated with the paving specified to be completed under this project. When joint steel is to be reused, the joint steel shall be cleaned to the satisfaction of the Resident before reinstallation.

The Contractor shall field measure existing joint openings as required to determine the appropriate replacement joint seal for Bridge Joint Modifications Type 3. All seals shall be approved by the Resident before materials are ordered.

The Contractor shall construct the joint to the dimensions shown on the plans and as approved by the manufacturer.

All transverse reinforcing steel shall be continuous across the length of the joint. The Contractor shall provide approved reinforcing steel coupler bars or lap splices at all construction joints.

No loading shall be placed on new joint concrete until the concrete has reached 80% of the specified design strength.

The Contractor shall install the joint or joint system according to the Manufacturer's latest written recommendations. The installers are encouraged to have a factory trained lead person(s) onsite during thejoint installation, or it's encouraged to have the approved Manufacturer/Supplier provide a qualified technical representative(s) to supervise the Contractor's personnel in the proper methods of installation of the joint system.

New or replacement seals shall be installed full width in one piece.

- Bridge Joint Modification Type 3 involves removing the existing pavement, cast-in-place, or elastomeric concrete header on both sides of the joint. Once the header material is removed, the deck concrete shall be removed to 1" below the top mat of the deck reinforcement or backwall reinforcement to provide ample anchorage of the new Polyester Polymer Concrete headers. The limits of the Polyester Polymer Concrete header work shall be the full deck width from face of curb to face of curb. The existing seal will be reused unless otherwise noted on the plans.

Temporary Structures and Approaches: In work zones where the roadway is opened up to traffic during non-work hours the Contractor shall submit a plan for how the roadway surfaces and any unfinished joints will be made acceptable for vehicular traffic. The plan shall be submitted to the Resident at least two weeks prior to intended date of use.

Method of Measurement: Bridge Joint Modification Types 3 will be measured by each unit, complete in place and accepted for the type(s) identified on the plans and described in this specification.

Temporary structures and approaches will not be measured separately but shall be incidental to the relevant Bridge Joint Modification pay item.

Installation and compaction of the hot mix asphalt for the profile grade platform will be measured and paid for under related contract items.

Basis of Payment: The accepted quantity of Bridge Joint Modification Type 3 will be paid for at the contract unit price per each. Payment will be full compensation for furnishing and installing all materials, labor, equipment, and incidentals necessary to complete the work, including removing and disposing of existing pavement, structural concrete, or elastomeric concrete; and adjusting and cleaning existing joint materials.

Traffic control devices used in conjunction with the temporary structures and approaches will be paid in accordance with the applicable Contract Items.

Payment will be made under:

Pay Item		Pay Unit
520.243	Bridge Joint Modification Type 3	Each

SPECIAL PROVISION
SECTION 526
CONCRETE BARRIER
(Temporary Portable Barrier)

526.01 Description: The following paragraph is added.

This work shall consist of the furnishing, setting, resetting, and removal of Temporary portable barrier and associated elements that may be made from concrete, steel, or polyethylene material.

526.02 Materials: The following paragraphs are added.

f. Alternative Temporary Portable Barrier Alternative Temporary Portable Barrier may be used in lieu of temporary concrete barrier. When alternative temporary portable barriers are proposed, the Contractor shall submit documentation to show that the alternative Temporary portable barrier has been independently tested to NCHRP Report 350 Test Level 3 (TL-3) unless the material to be provided was manufactured after 2019. If manufactured after 2019, the Contractor shall submit documentation to show that the alternative temporary portable barrier has been tested to Manual on Assessing Safety Hardware (MASH) 2016 TL-3. The submitted documentation shall also indicate the manufacturer-recommended buffer area based on the dynamic deflection exhibited in the crash testing results. Alternative temporary portable barrier shall include barrier reflectors, delineators and/or retroreflective striping to provide enhanced delineation of the barrier at night.

g. Temporary Glare Screens Temporary glare screens shall consist of modular units designed to prevent the direct intrusion of headlights within the line of sight of opposing or approaching drivers The temporary glare screen shall be installed on top of the Temporary portable barrier. The glare screens shall have a minimum height suitable to provide a visual barrier at 60 inches above the roadway when installed on the temporary portable barrier.

526.03 Construction Requirements: The following paragraph is added.

Alternative temporary portable barrier shall present a neat and uniform appearance and be free from any deformations that could snag a vehicle. If multiple colors are available for a temporary portable barrier product, the installation shall consist of a single color or regularly spaced alternating colors.

526.04 Method of Measurement: The following paragraphs are added.

Barrier reflectors, delineators, and retroreflective striping on the temporary portable barriers will not be measured but shall be considered incidental to the linear foot price for the Temporary

Portable Barrier.

Temporary glare screens will not be measured but shall be considered incidental to the linear foot price for the Temporary Portable Barrier.

526.05 Basis of Payment - The following paragraph and pay item are added:

The accepted quantities of Temporary Portable Barrier will be paid for at the contract unit lump sum price for Temporary Concrete Barrier, Type 1. Such payment shall be full compensation for furnishing all materials, assembling, moving, setting, resetting, transporting, temporary storage and removal of all barriers, barrier reflectors, delineators, retroreflective striping, and temporary glare screens. The payment shall also include all labor, tools, equipment, mounting hardware, and incidentals necessary to complete the work.

SPECIAL PROVISION
SECTION 527
ENERGY ABSORBING UNIT
(Truck Mounted Attenuator)

Description: This work consists of furnishing, maintaining, and deploying a truck mounted attenuator (TMA) and a shadow or barrier truck in accordance with this specification and as directed. A TMA must comply with NCHRP Report 350.

Materials: The energy absorbing system shall be from the Department's Qualified Products List (QPL). The TMA shall be mounted in accordance with the manufacturer's specifications to a truck with a gross vehicle weight (GVW) of at least 10,000 pounds.

Installation: The chart below identifies the distance from the work zone or hazard where the TMA shall be deployed. If the work zone is within a marked lane closure, the barrier truck distances shall apply. If the work is a mobile operation, the shadow truck distances shall apply. When used as a barrier, the barrier truck shall be parked in low gear with brakes applied and the front wheels turned away from the work zone and the adjacent traffic. For placement details, reference the Manual on Uniform Traffic Control Devices (MUTCD).

Weight of Truck	Barrier Truck Distance from Work Zone or Hazard	Shadow Truck Distance from Work Vehicle or Work Zone
10,000 lbs	250 ft	300 ft
15,000 lbs	200 ft	250 ft
>24,000 lbs	150 ft	200 ft

Method of Measurement: Truck Mounted Attenuator will be measured by each unit furnished based on the maximum number of units furnished at one time on the project.

Basis of Payment: The accepted quantity of Truck Mounted Attenuators will be paid for at the contract unit price each which includes furnishing and all costs of attaching to and retrofitting a truck on which the TMA will be deployed. Daily maintenance and deployment of the TMA, including the cost of owning, operating, and maintain the truck, shall be considered incidental.

Payment will be made under:

Pay Item		Pay Unit
527.33	Truck Mounted Attenuator	Each

SPECIAL PROVISION
SECTION 627
PAVEMENT MARKINGS
(Temporary Pavement Tape)
(Temporary Masking Tape)

Section 627 of the Standard Specifications is amended by the addition of the following:

627.01 Description Preformed pavement tape and masking tape shall be applied at locations shown on the plans by mechanical or manual methods. Mechanical applications shall be suitable for all markings. Manual applications shall normally be used for transverse lines, symbols, and legends. Follow manufacturer's recommendations for equipment operation and maintenance, and product applications.

Black line masking tape shall be wider than the colored line it is intended to mask.

Preformed pavement tape and masking tape shall be stored and applied as directed by the manufacturer. The Contractor shall provide a copy of the manufacturer's storage and application recommendations and the manufacturer's certificate of compliance to the Resident upon delivery of the material to the project. The certificate shall include the process, batch, or lot number(s) and corresponding date(s) of manufacture.

627.02 Materials

A. Temporary Pavement Tape – Temporary pavement tape shall consist of polymeric backing materials with a retroreflective surface. The Contractor shall ensure that the underside of the tape is pre-coated with a pressure-sensitive adhesive to bond the tape to the roadway surface and is capable of withstanding traffic immediately after installation and for the duration of the intended service. The Contractor shall use a primer only if recommended by the manufacturer.

   Tape shall have a minimum skid resistance of 35 British petroleum number (BPN) when tested according to ASTM E 303. The Contractor shall not use lead-based pigment in traffic tape. Temporary Pavement Tape shall conform to the requirements specified in the table below:

Requirements for Temporary Pavement Tape		
Property	White	Yellow
Minimum Specific Luminance (mcd/sq fc candelas) ASTM 4581[1]	500	300
Minimum Tensile Stress (psi)[2] ASTM D 538	4D	4D
FED-STD-595B Color Chip No.	3777B	3353B

1. Use an entrance angle of 88.76' and an observation angle of 1.05"

2. Perform tensile stress testing with a testing speed of 6 inches per minute

Tape shall be capable of being removed manually, intact or in large pieces, without the use of solvents, burning, grinding, or blasting and without damage to the underlying surface.

B. Removable Black Line Masking Tape - Black line masking tape shall be black in color, non-retroreflective, and a plant polymer material. The color shall conform to FED-STD-595B color chip No. 37030. Masking tape shall not produce a sheen under day, night, or wet conditions. Masking tape shall be capable of masking the underlying stripes so that they do not reflect through. Masking tape shall have a minimum skid resistance of 30 BPN when tested according to ASTM E 303. The underside of the tape shall be pre-coated with a pressure-sensitive adhesive to bond the tape to the roadway surface and shall be capable of withstanding traffic immediately after installation and for the duration of the intended service.

   The masking tape shall be capable of being removed manually, intact or in large pieces, at temperatures above 40°F, without the use of solvents, burning, grinding, or blasting and without damage to the underlying surface.

Material shall be delivered to the project in original containers. Each container shall be clearly marked to indicate the color of the material, a specific description of the contents, and the process batch or lot numbers.

Material found to be discolored or damaged in any way or material manufactured more than one year prior to installation shall not be used.

627.09 Method of Measurement Retroreflective temporary pavement tape and removable black line masking tape of the type and width specified will be measured by the linear foot, to the nearest foot of length of marking applied and removed.

627.10 Basis of Payment The accepted quantity of 6 Inch Temporary Pavement Tape, Yellow or White will be paid for at the Contract unit price per linear foot. Separate payment will not be made for the removal of temporary pavement tape.

The accepted quantity of 12 Inch Removable Black Line Masking Tape will be paid for at the Contract unit price per linear foot. Separate payment will not be made for the removal of removable pavement masking tape.

Temporary pavement marking tape that loses reflectivity, becomes broken, dislodged or missing during the life of the Contract shall be replaced by the Contractor at no additional cost to the Department.

Payment will be made under:

Pay Item		Pay Unit
627.51	6 Inch Temporary Pavement Tape, Yellow or White	Linear Foot
627.57	12 Inch Removable Black Line Masking Tape	Linear Foot

SPECIAL PROVISION
SECTION 631
EQUIPMENT RENTAL
(Welding Machine (including operator))

In section 631.01 of the Standard Specification under Description, the following paragraph is added:

This work consists of providing a welding machine (220V generator/welder, minimum 20 HP) and an AWS D5.1 certified operator along with all necessary equipment to cut, grind, weld, and fabricate structural and miscellaneous steel.

The work undertaken under this equipment rental item includes heat straightening bent joint armor, joint armor repairs, welding shear studs, and other metal work requested by the Resident.

631.08 Basis of Payment The following pay item is added:

Pay Item		Pay Unit
631.112	Welding Machine (including operator)	Hour

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC
Smart Work Zone System
Automated End-of-Queue warning system

Standard Provision 652 MAINTENANCE OF TRAFFIC is amended as follows.

652.1 Description

The following paragraphs are added:

This work shall consist of furnishing, installing, operating, servicing, maintaining, relocating, and removing an automated end-of-queue warning system, known as a Smart Work Zone System (SWZS). This work will be in place for duration of the Project.

SWZ systems will be classified in two distinct uses:

Type 1 will be a temporary automated end of queue warning system used when the expected traffic queue length is 3 miles or less.

Type 2 will be a temporary automated end of queue warning system used when the expected traffic queue length is 7 miles or less.

652.1.1 Smart Work Zone Submittals

The Contractor shall submit to the Resident for approval a plan which shall detail the SWZS system, including the following information:

- The Contractor shall identify the supplier of the SWZS, which has successfully completed at least five (5) smart work zone projects in New England similar in concept and scope to the proposed system in the past five (5) years.
- The proposed supplier shall also provide the credentials of a qualified technician who shall install, operate and train Contractor's personnel on the use of the system.
- The Contractor shall include names, addresses, and telephone numbers of the similar project's owner's representatives for verification.
- The technical submittal for the SWZS shall be submitted in accordance with 105.7.2 of the latest versions of the Standard Specifications.
- The Contractor's Traffic Control Plan shall discuss intended use and project specific applications and reference the SWZS submittals.

Once the SWZS have been reviewed and accepted, the Contractor shall submit brochures and cut sheets on all units of the SWZS, with details of how and which communications systems shall be used, and all technical specifications. The Contractor shall also include the submittal the actual SWZS device, operation, maintenance, monitoring and including a SWZS layout map for each work zone. The Contractor shall update the Traffic Control Plan as needed.

At the completion of the project, the Contractor will attend a post construction debriefing to discuss positive and negative aspects of the system and potential ways to improve its operational effectiveness and project applicability.

652.2 Materials

The following section is added:

652.21 Smart Work Zone Equipment

Type 1 SWZS shall consist of a controller, a minimum 4 traffic sensors and a minimum of 2 PCMS.

Type 2 SWZS shall consist of a controller, a minimum 8 traffic sensors and a minimum of 4 PCMS.

Type 1 and Type 2 SWZS shall include a complete communication system, hardware, software, and support necessary to make a complete and operating system that provides advance traffic information to motorists when there is a slowing of traffic due to congestion resulting from lane reductions or other conditions. The condition-responsive notification to the motorist occurs with the use of PCMS activated through real-time traffic data collected by portable traffic sensors downstream of the PCMS location.

The system shall be capable of storing ad-hoc messages created by the System Coordinator and logging this action when overriding any default or automatic advisory message. The SWZS communication system shall incorporate an error detection/correction mechanism to ensure the integrity of all traffic conditions data and motorist information messages. Any required configuration of the SWZS communication system shall be performed automatically during system initialization.

System operator local control functions and remote management operations shall be password protected. The SWZS shall be capable of acquiring traffic information and selecting messages automatically without operator intervention after system initialization. The lag time between changes in threshold ranges and the posting of the appropriate PCMS messages shall be no greater than 15 seconds. The system operation and accuracy shall not be appreciably degraded by inclement weather or degraded visibility conditions including precipitation, fog, darkness, excessive dust, and road debris.

The portable traffic sensors shall be capable of collecting traffic speed data. The processed data is used to remotely control the PCMS to display user definable and locally stored messages. The message trigger thresholds shall be user configurable. The format of the data feed shall be extensible Markup Language (XML), with a known schema shared with the purchaser and made available to the Department. The XML data shall be made available for Department access (including project staff and the Department's Traffic Management

Center) through standard Internet connectivity and services, with the provision of a data feed address, port (if applicable), and authentication/sign-on parameters.

The system shall have basic field and network security to protect the system against vandalism and unauthorized use.

The Contractor shall obtain cellular telephone service, FCC licensing, wireless data networks, satellite and internet subscriptions, and other requirements as necessary to operate the system continuously.

Provide an on-site System Coordinator for the SWZS the system components, monitor and adjust the portable devices as necessary, provide documentation in the form of a written weekly report about the system and respond to emergency situations. The System Coordinator shall either be a system vendor representative or shall have received training on the set-up and operation of the system from the system vendor or manufacturer. Provide certification of any such training to the Resident prior to system set-up. The System Coordinator shall work with the Resident on the operation of the SWZS including when to deploy or relocate the field devices, how the system is operating, and when to remove the system. The System Coordinator shall attend the pre-construction meeting and progress meetings. Secure approval from the Department on all PCMS messages prior to use. Be available 7 days a week and 24 hours a day while the system is deployed. Provide the 24/7 contact information for the System Coordinator and others responsible for maintenance of the system prior to installation of the system.

652.3 Smart Work Zone General Operation

The SWZS shall provide required functionality when the traffic sensors are located approximately as follows.

Type 1: The first sensor shall be located at the lane closure, second sensor 0.5 mile back from lane closure, third sensor 1 mile from lane closure, and a fourth sensor located 2 miles from lane closure. One PCMS shall be located 1 mile in advance of the lane closure and the second PCMS shall be located 2.5 miles from lane closure. The system shall provide full functionality when the sensors and PCMS are relocated, and field adjusted as needed to provide adequate warning to the motoring public of traffic congestion ahead. Adjust the spacing of the devices and portable PCMS as needed.

Type 2: The Type 2 will utilize the same layout as the Type 1 system for the first 2.5 miles, then expanding the system by adding sensors at each mile and an additional 2 PCMS located at 5 miles and 7 miles from the lane closure.

On entrance ramps within the SWZS operational area, BE PREPARED TO STOP sign downstream from the ROAD WORK AHEAD sign shall be installed and maintained for the duration of the SWZS.

The SWZS shall be installed and operational prior to the start of the placement of the channelizing devices to close any travel lanes. Verify that the system is operating prior to

initiating the actual lane closure. The SWZS shall remain in place and operational until after the travel lane is reopened. The system shall constantly monitor traffic and update the messages on the portable PCMS within 15 seconds of a traffic condition requiring a system update. Each message shall be displayed on the portable PCMS for a minimum of 3 minutes.

The SWZS shall be in a constant "data collection" mode. In the event communication is lost between any field equipment, provide a means and staff to manually program a PCMS message. If communication is lost for more than 10 consecutive minutes, the system shall revert to a fail-safe ROAD/WORK/AHEAD message displayed on the PCMS until communication is restored.

The SWZS shall be monitored throughout any period of deployment and the Contractor shall submit a weekly report that will include the following activities during the project:

1. Confirm/note device layout/placement.
2. Confirm/note system data collection parameters that were set and adjusted.
3. Confirm/note startup and validation activities.
4. Note any changes/modifications made throughout the day or any unusual events that may impact the integrity of the data.
5. Confirm/note system shutdown processes and identify any changes that may be needed.
6. Observe device packing processes for relocation to the next work zone area and note any improvements that may be needed to improve the efficiency of the system deployment.
7. Number of and types of activations the system performed.
8. Construction work zone deployments
9. What if any field adjustments were made.
10. Maintain an adequate inventory of parts to support maintenance and repair of the SWZS.
11. The effectiveness of the adjustments made as well as comments from the flagging staff on each end of the active work zone (with and without the SWZS).
12. Public reaction and behavior when in the traffic control.
13. System start up and testing procedures
14. System operational procedures
15. System maintenance procedures
16. System shutdown procedures

SWZS will not be used if there is no queue.

652.31 Smart Work Zone –Device Placement

The Contractor shall place the traffic queue sensors (TQS), and PCMS outside of the clear zone, along the shoulder of I-95 a minimum of 30-feet from edge of travel way. PCMS should be a minimum of 300 feet from permanent signs.

For the Northbound I-95 Type 2 SWZS the Contractor shall furnish, install and operate PCMS at the following locations:

1. 95-N-PCMS1-1.0M: Approximately 1 mile in advance of lane closure on Northbound I-95 at mile point 126.3 along the right shoulder. This location is approximately 3,000 feet north of the Kennedy Memorial Drive underpass bridge.
    a. The Contractor may request use and incorporation of the existing PCMS located at the median crossover located 100 feet north of the above location.
2. 95-N-PCMS2-2.5M: Approximately 2.5 miles in advance of lane closure on Northbound I-95 at mile point 124.8 along the right shoulder. This location is approximately 300 feet north of the existing Exit 127 1 Mile sign.
3. 95-N-PCMS3-5.0M:. Approximately 5 miles in advance of lane closure on Northbound I-95 at mile point 122.3 along the right shoulder. This location is approximately ¼ mile north of the Town Farm Road overpass bridge.
    a. The Contractor may request use and incorporation of the existing PCMS located at the median crossover located 300 feet south of the above location.
4. 95-N-PCMS4-7.0M: Approximately 7 miles in advance of lane closure on Northbound I-95 at mile point 120.4 along the right shoulder. This location is approximately 2,900 feet south of the Drummond Road overpass bridge.

For the Northbound I-95 Type 2 SWZS the Contractor shall furnish, install and operate TQS at the following locations:

1. 95-N-TQS1-0.0M: At the beginning of the taper for the lane closure on Northbound I-95 at approximate mile point 127.3 along the right shoulder. This location is approximately 200 feet north of the Armstrong Road overpass bridge.
2. 95-N-TQS2-0.5M: Approximately 0.5 miles in advance of lane closure on Northbound I-95 at mile point 126.8 along the right shoulder. This location is approximately 5,700 feet north of the Kennedy Memorial Drive underpass bridge.
3. 95-N-TQS3-1.0M: Approximately 1.0 miles in advance of lane closure on Northbound I-95 at mile point 126.3 along the right shoulder. This location is approximately 3,000 feet north of the Kennedy Memorial Drive underpass bridge. This sensor will be collocated with 95-N-PCMS1-1.0M.
4. 95-N-TQS4-2.0M: Approximately 2.0 miles in advance of lane closure on Northbound I-95 at mile point 125.3 along the right shoulder. This location is approximately 850 feet north of the Exit 127 services sign.
5. 95-N-TQS5-3.0M: Approximately 3.0 miles in advance of lane closure on Northbound I-95 at mile point 124.3 along the right shoulder. This location is approximately 1,000 feet north of the Webb Road underpass bridge.
6. 95-N-TQS6-4.0M: Approximately 4.0 miles in advance of lane closure on Northbound I-95 at mile point 123.3 along the right shoulder. This location is approximately 2,000 feet north of the Trafton Road overpass bridge.
7. 95-N-TQS7-5.0M: Approximately 5.0 miles in advance of lane closure on Northbound I-95 at mile point 122.3 along the right shoulder. This location is approximately ¼ mile north of the Town Farm Road overpass bridge. This sensor will be collocated with 95-N-PCMS3-5.0M.
8. 95-N-TQS8-6.0M: Approximately 6.0 miles in advance of lane closure on Northbound I-95 at mile point 121.3 along the right shoulder. This location is approximately 1,800 feet north of the Drummond Road overpass bridge.

For the Southbound I-95 Type 2 Smart Work Zone the Contractor shall provide PCMS at the following locations:

2. 95-S-PCMS1-1.0M: Approximately 1 mile in advance of lane closure on Southbound I-95 at mile point 130.3 along the right shoulder. This location is approximately 2,800 feet south of the Route 139 overpass bridge
    a. The Contractor may request use and incorporation of the existing PCMS located 350 feet to the south of the above location.
3. 95-S-PCMS2-2.5M: Approximately 2.5 miles in advance of lane closure on Southbound I-95 at mile point 131.7 along the right shoulder within the Exit 133 interchange. This location is in the gore area of the Exit 133 Southbound on-ramp.
4. 95-S-PCMS3-5.0M: Approximately 5 miles in advance of lane closure on Southbound I-95 at mile point 134.3 along the right shoulder. This location is approximately 4,200 feet south of the Bellsqueeze Road overpass bridge.
5. 95-S-PCMS4-5.0M: Approximately 7 miles in advance of lane closure on Southbound I-95 at mile point 136.2 along the right shoulder. This location is in the gore area of the Exit 138 Southbound on-ramp.
    a. The Contractor may request use and incorporation of the existing PCMS located at the median crossover located 1,800 feet south of the above location.

For the Southbound I-95 Type 2 SWZS the Contractor shall furnish, install and operate TQS at the following locations:

1. 95-S-TQS1-0.0M: At the beginning of the taper for the lane closure on Southbound I-95 at approximate mile point 129.3 along the right shoulder. This location is at a median crossover approximately 8,000 feet south of the Route 139 overpass bridge.
2. 95-S-TQS2-0.5M: Approximately 0.5 miles in advance of lane closure on Southbound I-95 at mile point 129.8 along the right shoulder. This location is approximately 5,500 feet south of the Route 139 overpass bridge.
3. 95-S-TQS3-1.0M: Approximately 1.0 miles in advance of lane closure on Southbound I-95 at mile point 130.3 along the right shoulder. This location is approximately 2,750 feet south of the Route 139 overpass bridge. This sensor will be collocated with 95-S-PCMS1-1.0M.
4. 95-S-TQS4-2.0M: Approximately 2.0 miles in advance of lane closure on Southbound I-95 at mile point 131.3 along the right shoulder. This location is approximately 3,000 feet to the south of the US 201 underpass bridge.
    a. Alternatively, the Contractor may use the median cross over approximately 300 feet to the north of the location above for the TQS on the left side of I-95 Southbound.
5. 95-S-TQS5-3.0M: Approximately 3.0 miles in advance of lane closure on Southbound I-95 at mile point 132.3 along the left shoulder. This location is approximately 2,000 feet south of the River Road underpass bridge.
6. 95-S-TQS6-4.0M: Approximately 4.0 miles in advance of lane closure on Northbound I-95 at mile point 133.3 along the right shoulder. This location is approximately 9,000 feet south of the Bellsqueeze Road underpass bridge.
7. 95-S-TQS7-5.0M: Approximately 5.0 miles in advance of lane closure on Southbound I-95 at mile point 134.3 along the right shoulder. This location is approximately 4,200 feet south of the Bellsqueeze Road underpass bridge. This sensor will be collocated

with 95-S-PCMS3-5.0M.

8. 95-S-TQS8-6.0M: Approximately 6.0 miles in advance of lane closure on Northbound I-95 at mile point 135.3 along the right shoulder. This location is approximately 5,700 feet south of the Hinckley Road underpass bridge.

The Contractor may propose alternative locations for the PCMS and/or TQS for the Type 2 Smart Work Zone described above. The Contractor shall submit any alternative locations to the Resident for review and approval.

652.7 Method of Measurement

The following paragraphs are added:

The SWZS will be measured based on uninterrupted operation of the complete system per each unit.

a) The payment of each unit will be payable in installments as follows:
30% payment will be made once the final SWZS is approved and in operation. The remaining 70% balance to be paid as the work progresses at a rate proportional to the use and operation of the complete system.
b) If the operation of the SWZS is down for more than five (5) total accumulative days, payment will be reduced by 10% and the Contractor will prepare and submit a plan to restore uninterrupted operations of the SWZ system.

652.8 Basis of Payment

The following paragraphs are added:

The accepted quantity of Smart Work Zone Systems (SWZS) will be paid for at the Contract unit price per each for uninterrupted operation and complete in place. Payment shall be full compensation for furnishing, installing, operating, servicing, maintaining, cleaning, and repair of all materials, equipment, tools, software, communications and labor to operate a SWZS as described in this specification or as directed by the Resident. Payment shall also include relocating and removing any automated SWZS, all operational and service costs, FCC licensing, wireless data networks, satellite and internet subscriptions, and other requirements as necessary to operate the system continuously.

Payment will be made under:

Item Number	Description	Unit
652.441	Type 1 Smart Wok Zone System	EA
652.442	Type 2 Smart Wok Zone System	EA

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC
(Automated Speed Limit Sign)

652.1 Description: This special provision provides for furnishing, operating, and maintaining an Automated Trailer Mounted Radar Speed Limit Sign for project use. The Contractor shall furnish, operate, and maintain the Automated Trailer Mounted radar Speed Limit Signs during the project operations.

652.1.1: Instruction and maintenance manuals shall be provided.

652.2 Materials: Automated Trailer Mounted Speed Limit Sign

Trailer mounted speed limit signs shall be self-contained units including sign assembly, flashing lights, directional radar to measure speed limits, a regulatory speed limit sign, a construction sign stating "Work Zone Speed Limit When Flashing" and power supply specifically constructed to operate as a trailer-mounted sign. The preferred color of the unit shall be "construction orange".

Signs Base material for the regulatory speed limit signs shall be weather proof, rigid substrate specifically manufactured for highway signing and meet the retro-reflective sheeting application requirements of the sheeting manufacturer.

Sign text shall consist of the letters, digits and symbols either applied by stick-on or silk screen, to conform to the dimensions and designs indicated in the Contract, MUTCD and/or FHWA Standard Highway Signs. The materials and methods shall be in accordance with standard commercial processes.

The regulatory sign should have changeable speed limit numbers.

"Work Zone" construction signs shall be mounted on the trailer unit above and below the regulatory speed limit sign. (see attached detail). The "When Flashing "construction sign shall be added to the trailer, if the Resident deems the sign necessary.

Signs and secondary signs shall follow the MUTCD for minimum mounting heights.

Power supply The power supply shall be either full battery power with solar panel charging (capable of maintaining a charged battery level) and 135 ampere, 12 volt deep cycle batteries, or diesel powered generator with a fuel capacity sufficient for 10 hours of continuous operation.

Flashing Lights Each unit shall be equipped with two mono-directional flashing lights, placed in accordance with the MUTCD, with amber lenses and reflectors, which are visible through a range of 120 degrees when viewed facing the sign. The lights, either strobe, halogen, or incandescent lamps, shall be visible for a minimum distance of one mile under daylight conditions and shall have a minimum flash rate of 40 flashes per minute. An "On" indicator light

shall be mounted on the back of the signs, which is visible for at least 500 feet to provide confirmation that the flashing lights are operating.

Radar The directional radar shall monitor approaching traffic only. The radar shall be capable of measuring speeds from 5 to 70 MPH at a distance of up to 1500 feet and shall have a high speed cut off thresh hold.

Data Collection Units shall obtain traffic data, statistics, to include location, speeds, and times. This information shall be capable of being downloaded from the sign location with Bluetooth, wireless connection, or be accessed remotely via cellular data link. Units shall also have the capability to download this information via a USB port. Software to interface with PC or MAC Operating Systems shall be provided to the Department.

CONSTRUCTION REQUIREMENTS

652.3.2 Responsibility of the Contractor: The Contractor shall furnish the automated Trailer Mounted Speed Limit Sign as described in 2.1 for this project.

All existing speed limit signs, which conflict with the construction zone trailer mounted speed limit signs shall be covered completely during the operation of the flashing lights. These signs shall be immediately uncovered when the use of the flashing lights is discontinued.

Automated Trailer Mounted Speed Limit Signs shall be used only during the Contractor's actual work hours, unless specifically authorized by the Engineer.

The Resident will record the actual time and location for the signs on a daily basis when the Automated Trailer Mounted Speed Limit Signs are in use.

Automated Trailer Mounted Speed Limit Signs shall be located as directed by the Resident. Placement of additional "Reminder' signs may be ordered by the Resident.

Automated Trailer Mounted Speed Limit Signs shall be placed outside the clear zone whenever practical and possible. The signs shall be removed outside the clear zone of the traveled way as specified in the Traffic Control Plan when not in use unless protected by portable barrier or equivalent. The signs shall be delineated with retro-reflective temporary traffic control devices while in use and shall also be delineated by affixing a retro-reflective material directly on the trailer.

Upon delivery of the Automated Trailer Mounted Speed Limit Sign and before acceptance by the Department, the Contractor shall have a representative of the manufacturer review the condition and notify the Resident in writing, of all deficiencies noted.

The Contractor shall arrange to have all necessary repairs performed at no cost to the Department.

To avoid impairing driver vision, the Contractor shall dim the lighted speed limit readings by 50 percent during nighttime use, and restore full power lighting during daytime operation.

METHOD OF MEASUREMENT

652.7 Method of Measurement: Each Automated Trailer Mounted Speed Limit Sign will be measured as a unit.

A unit will include the unit as described in 2.1, the trailer, radar Speed Limit Sign, flashing beacon amber lights, regulatory speed limit sign, "Work Zone Speed limit when flashing" construction sign, fuel, necessary maintenance, and all checking of radar Speed Limit Signs by manufacturer. Also included are all project moves including the transporting and delivery of each unit.

BASIS OF PAYMENT

652.8 Basis of Payment: The accepted quantity of Automated Trailer Mounted Speed Limit Sign will be paid for at the contract price per unit for the number of units used and accepted.

Payment will be made under:

Pay Item	Pay Unit
652.45 Automated Trailer Mounted Speed Limit Sign	Unit

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC
(Portable Changeable Message Sign)

652.3.4 Description: The following paragraph is added.

The accepted quantity of Portable Changeable Massage Signs (PCMS) shall be in addition to those included in the Smart Work Zone System (SWZS).

652.2.5 Submittal of Traffic Control Plan: The following paragraphs are added.

PCMS units shall have the capability of being of being integrated with the SWZS at the request of the Resident. When integrated with the SWZS, the PCMS shall have basic field and network security to protect the system against vandalism and unauthorized use, be capable of acquiring traffic information and selecting messages automatically without operator intervention after system initialization.

The SWZS System Coordinator shall work with the Resident on the operation of the PCMS including when to integrate with the SWZS, when to deploy or relocate, how the PCMS is operating, and when to remove the PCMS.

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC
(Sequential Flashing Warning Lights)

652.01 Description: Delete the second paragraph and replace with the following.

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

652.3.7 Sequential Flashing Warning Lights: The following paragraphs are added.

Sequential Flashing Warning Lights shall be installed on drums used for merging tapers and shifting tapers during night time operations. The number of flashing lights used in the taper shall equal one half of the number of drums used in the taper. The final flashing light shall be installed on the first drum of the downstream tangent section. Drums are the only channelizing devices permitted for mounting the sequential flashing warning lights.

The sequential flashing warning lights shall automatically sequence when placed in line in an open area with a distance between lights of 25 to 150 feet. A ten foot stagger in the line of lights shall have no adverse effect on the operation of the lights. The failure of one light in the sequence shall not interrupt the flashing sequence.

The successive flashing of the lights shall occur beginning at the upstream end of the taper to the downstream end of the taper. Each light in sequence shall be flashed at a rate of not less than 55 times per minute and not more than 75 times per minute. The flash rate and flash duration shall be consistent throughout each sequence and across all sequences per direction of traffic.

652.7 Method of Measurement: The following paragraph is added.

Sequential Flashing Warning Lights will be measured by each flashing warning light group, installed and accepted. A group shall be considered all flashing warning lights within one continuous taper and/or transition.

652.8 Basis of Payment - The following paragraph and pay item are added:

The accepted quantity of Sequential Flashing Warning Lights will be paid for at the contract unit price for each Unit, where a unit is defined as one group of sequential flashing warning lights. Such payment shall be full compensation for furnishing all materials, operating, moving, setting, resetting, transporting, temporary storage and removal of all flashing lights. The payment shall also include all labor, tools, equipment, mounting hardware, and incidentals necessary to complete the work.

Pay Item	Pay Unit
652.46 Sequential Flashing Warning Lights	Unit

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC
(Temporary Portable Rumble Strips)

652.01 Description: The following paragraph is added.

This work shall also consist of furnishing, installing, maintaining, relocating, and removing temporary rumble strips across the travel lanes.

652.2 Materials: The following paragraphs are added.

Temporary portable rumble strips shall be designed for use on roadways with speeds of up to 70 miles per hour (mph). They shall be either white or orange and include a high traction surface. Each strip deployment shall be designed for implementation in one 12-foot travel lane.

Temporary portable rumble strips shall accommodate motorcycles, cars, trucks, and vehicles with trailers. The profile height of the rumble strips shall be more than 0.5 inches but not more than 0.8 inches.

652.5.2 Temporary Portable Rumble Strips: The following paragraphs are added.

The Contractor shall submit catalog cuts for the proposed temporary rumble strips to be deployed prior to procurement of any product.

Prior to placement of rumble strips, the Contractor shall clean the roadway of sand, debris and other materials that could cause the rumble strip to dislocate. Rumble strips shall lay flat on the roadway surface. If any portion of a rumble strip is dislodged, becomes out of alignment with the vehicle wheel paths or is damaged in any way, the Contractor shall remove and reset or remove and replace the rumble strips immediately.

The temporary portable rumble strips shall create a vibration and audible indication similar in nature to permanent, grooved rumble strips.

Installation shall require no tools, nails, or adhesive to apply. A two person crew shall be capable of deploying and/or removing one rumble strip in a single travel lane in less than 10 minutes. One end of the rumble strip shall be placed within six inches of the edge of traveled way in the lane. Installation shall be perpendicular to the direction of travel.

652.7 Method of Measurement: The following paragraph is added.

Temporary portable rumble strip will be measured by each rumble strip group, installed and accepted. A group shall be considered three units deployed at equal spacing in a single travel

lane.

652.8 Basis of Payment - The following paragraph and pay item are added:

The accepted quantity of Temporary Portable Rumble Strip will be paid for at the contract unit price for each group. Such payment shall be full compensation for furnishing all materials, setting, resetting, maintaining, transporting, temporary storage, and removal of all temporary rumble strips. The payment shall also include all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
652.47 Temporary Portable Rumble Strip	Group (GP)