MAINE TURNPIKE AUTHORITY

MAINE TURNPIKE

CONTRACT DOCUMENTS

CONTRACT 2018.02

EXIT 47 INTERSECTION IMPROVEMENTS
PAVEMENT REHABILITATION, AND CLEAR ZONE IMPROVEMENTS
MILE 47

NOTICE TO CONTRACTORS

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SPECIFICATIONS

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

The Specifications are divided into two parts:
Part I, Supplemental Specifications and Part II, Special Provisions.

The Maine Turnpike Supplemental Specifications are additions and alterations to the 2014 Maine Department of Transportation Standard Specifications. See Subsection 100.1.

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ARRANGEMENT OF SPECIFICATIONS

MAINE TURNPIKE AUTHORITY

NOTICE TO CONTRACTORS

Sealed Proposals will be received by the Maine Turnpike Authority for:

CONTRACT 2018.02

EXIT 47 INTERSECTION IMPROVEMENTS,
PAVEMENT REHABILITATION, AND CLEAR ZONE IMPROVEMENTS
MILE 47

at the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, ME, until 11:00 a.m., prevailing time as determined by the Authority on August 30, 2018 at which time and place the Proposals will be publicly opened and read. Bids will be accepted from Contractors **prequalified** by the Maine Department of Transportation for Paving Construction Projects and a subcontractor prequalified for Highway Lighting and Traffic Signal Projects. All other bids may be rejected. This Project includes a wage determination developed by the State of Maine Department of Labor.

The work consists of intersection improvements at the intersection of Exit 47 and Rand Road and paving rehabilitation and clear zone improvements at the Exit 47 interchange in the City of Portland, Maine. The work includes widening of Rand Road and the Toll Approach Road and paving of the Exit 47 Interchange, guardrail, maintenance of traffic and all other work incidental thereto in accordance with the Plans and Specifications.

Plans and Contract Documents may be examined by prospective Bidders weekdays between 8:00 a.m. and 4:30 p.m. at the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, Maine. **The half size Plans** and Contract Documents may be obtained from the Authority upon payment of Seventy Five ($75.00) Dollars for each set, which payment will not be returned. Checks shall be made payable to: Maine Turnpike Authority. The Plans and Contract Documents may also be downloaded from a link on our website at http://www.maineturnpike.com/project-and-planning/Construction-Contracts.aspx.

For general information regarding Bidding and Contracting procedures, contact Nate Carll, Purchasing Manager, at (207) 482-8115. For information regarding Schedule of Items, plan holders list and bid results, visit our website at **http://www.maineturnpike.com/project-and-planning/Construction-Contracts.aspx** . For Project specific information, fax all questions to Nate Carll, Purchasing Manager, at (207) 871-7739 or email ncarll@maineturnpike.com. Responses will not be prepared for questions received by telephone. Bidders shall not contact any other Authority staff or Consultants for clarification of Contract provisions, and the Authority will not be responsible for any interpretations so obtained.

All work shall be governed by the Specifications entitled "State of Maine, Department of Transportation, Standard Specifications, Revision of November 2014", "Standard Details, Revision of November 2014" and "Best Management Practices for Erosion and Sediment

Control", latest issue. Copies and recent updates to these publications can be downloaded at: http://www.maine.gov/mdot/contractors/publications/ .

Proposals must be accompanied by an original bid bond, certified or cashier's check payable to the Maine Turnpike Authority in an amount not less than Five (5%) Percent of the Total Amount in the Proposal, but not less than $500.00. The Bidder to whom a Contract is awarded will be required to furnish a Surety Corporation Bond, satisfactory to the Authority, on the standard Contract Bond form of the Authority, for a sum not less than the Total Amount of the Proposal.

Proposals must be made upon the Proposal Forms furnished by the Authority separately with the Contract Documents, and must be enclosed in the sealed special addressed envelope provided therefore bearing the name and address of the Bidder, the name of the Contract, and the date and time of Proposal opening on the outside.

A pre-bid conference will be held on August 14, 2018 at 10:00 a.m. at the Maine Turnpike Authority, 2360 Congress Street, Portland, Maine.

The Authority reserves the unqualified right to reject any or all Proposals and to accept that Proposal which in its sole judgment will under all circumstances serve its best interest.

MAINE TURNPIKE AUTHORITY

Nate Carll
Purchasing Manager
Maine Turnpike Authority

Portland, Maine

Maine Turnpike Authority

MAINE TURNPIKE

PROPOSAL

CONTRACT 2018.02

EXIT 47 INTERSECTION IMPROVEMENTS, PAVEMENT REHABILITATION, AND CLEAR ZONE IMPROVEMENTS MILE 47

MAINE TURNPIKE AUTHORITY

PROPOSAL

CONTRACT 2018.02

EXIT 47 INTERSECTION IMPROVEMENTS,
PAVEMENT REHABILITATION, AND CLEAR ZONE IMPROVEMENTS
MILE 47

TO MAINE TURNPIKE AUTHORITY:

The work consists of intersection improvements at the intersection of Exit 47 and Rand Road and paving rehabilitation and clear zone improvements at the Exit 47 interchange in the City of Portland, Maine. The work includes widening of Rand Road and the Toll Approach Road and paving of the Exit 47 Interchange, guardrail, maintenance of traffic and all other work incidental thereto in accordance with the Plans and Specifications.

This Work will be done under a Contract known as Contract 2018.02 according to the Plans and Specifications which are on file in the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, Maine.

On the acceptance of this Proposal for said Work, the undersigned will give the required bond with good security conditioned for the faithful performance of said Work, according to said Plans and Specifications, and the doing of all other work required by said Specifications for the consideration herein named and with the further condition that the Maine Turnpike Authority shall be saved harmless from any and all damages that might accrue to any person, persons or property by reason of the carrying out of said Work, or any part thereof, or by reason of negligence of the undersigned, or any person or persons under his employment and engaged in said Work.

The undersigned hereby declares that he/she has carefully examined the Plans, Specifications and other Contract Documents, and that he/she will contract to carry out and complete the said Work as specified and delineated at the price per unit of measure for each scheduled item of Work stated in the Schedule of Prices as follows:

It is understood that the TOTAL AMOUNT stated by the undersigned in the following Schedule of Prices is based on approximate quantities and will be used solely for the comparison of bids, and that the quantities stated in the Schedule of Prices for the various items are estimates only and may be increased or decreased all as provided in the Specifications.

Acknowledgment is hereby made of the following Addenda received since issuance of the Plans and Specifications: _____

_____

_____

Accompanying this Proposal is an original bid bond, cashiers or certified check on _____ Bank, for _____, payable to the Maine Turnpike Authority. In case this Proposal shall be accepted by the Maine Turnpike Authority and the undersigned should fail to execute a Contract with, and furnish the security required by the Maine Turnpike Authority as set forth in the Specifications, within the time fixed therein, an amount of money equal to Five (5%) Percent of the Total Amount of the Proposal for the Contract awarded to the undersigned, but not less than $500.00, obtained out of the original bid bond, cashier's or certified check, shall become the property of the Maine Turnpike Authority; otherwise the check will be returned to the undersigned.

The performance of said Work under this Contract will be completed during the time specified in Subsection 107.1.

It is agreed that time is of the essence of this Contract and that I (we) will, in the event of my (our) failure to complete the Work within the time limit named above, pay to Maine Turnpike Authority liquidated damages in the amount or amounts stated in the Specifications.

The undersigned is an Individual/Partnership/Corporation under the laws of the State of _____, having principal office at _____, thereunto duly authorized.

_____ *(SEAL)*

_____ *(SEAL)*

Affix Corporate Seal
or Power of Attorney
Where Applicable

_____ *(SEAL)*

By: _____

Its: _____

Information below to be typed or printed where applicable:

INDIVIDUAL:

_____	_____
(Name)	(Address)

PARTNERSHIP - Name and Address of General Partners:

_____	_____
(Name)	(Address)
_____	_____
(Name)	(Address)
_____	_____
(Name)	(Address)
_____	_____
(Name)	(Address)

INCORPORATED COMPANY:

_____	_____
(President)	(Address)
_____	_____
(Vice-President)	(Address)
_____	_____
(Secretary)	(Address)
_____	_____
(Treasurer)	(Address)

MAINE TURNPIKE AUTHORITY

MAINE TURNPIKE

YORK TO AUGUSTA

CONTRACT AGREEMENT

This Agreement made and entered into between the Maine Turnpike Authority, and sometimes termed the "Authority", and _____

_____

herein termed the "Contractor":

WITNESSETH: That the Authority and the Contractor, in consideration of the premises and of the mutual covenants, considerations and agreements herein contained, agree as follows:

FIRST: The parties hereto mutually agree that the documents attached hereto and herein incorporated and made a part hereof collectively evidencing and constituting the entire Contract to the same extent as if herein written in full, are the Notice to Contractors, the Accepted Proposal, the Specifications, the Plans, this Agreement, the Contract Bond and all Addenda to the Contract Documents duly issued and herewith enumerated:

_____

_____

SECOND: The Contractor for and in consideration of certain payments to be made as hereafter specified, hereby covenants and agrees to perform and execute all of the provisions of this Contract and of all documents and parts attached hereto and made a part thereof, and at his own cost and expense to furnish and perform everything necessary and required to construct and complete, ready for its intended purpose, in accordance with the Contract and such instructions as the Engineer may give, acceptable to the Authority, in the times provided, all of the Work covered and included under Contract No. _____ covering _____ as herein described.

THIRD: In consideration of the performance by the Contractor of his covenants and agreements as herein set forth, the Authority hereby covenants and agrees to pay the Contractor according to the Schedule of Prices set forth in the Proposal with additions and deductions as elsewhere herein provided in the times and in the manner stated in the Specifications. This Agreement shall insure to the benefit of, and shall be binding upon the parties hereto, and upon their respective successors and assigns; but neither party hereto shall assign or transfer his interest herein in whole or in part without the consent of the other, except as herein provided.

IN WITNESS WHEREOF the parties to this Agreement have executed the same in quintuplicate.

AUTHORITY -

MAINE TURNPIKE AUTHORITY

By: _____

Title: CHAIRMAN

Date of Signature: _____

ATTEST:

_____
Secretary

CONTRACTOR -

_____
CONTRACTOR

By: _____

Title: _____

Date of Signature: _____

WITNESS:

_____

CONTRACT BOND

KNOW ALL MEN BY THESE PRESENTS that _____

of _____ in the County of _____ and State of _____

as Principal, and _____ a Corporation duly organized under the

laws of the State of _____ and having a usual place of business in _____

_____

As Surety, are held and firmly bound unto the Maine Turnpike Authority in the sum of _____Dollars ($_____.___), to be paid to said Maine Turnpike Authority, or its successors, for which payment, well and truly to be made, we bind ourselves, our heirs, executors, successors and assigns jointly and severally by these presents.

The condition of this obligation is such that the Principal, designated as Contractor in the foregoing Contract No. _____ shall faithfully perform the Contract on his part and satisfy all claims and demands incurred for the same and shall pay all bills for labor, material, equipment and all other items contracted for, or used by him, in connection with the Work contemplated by said Contract, and shall fully reimburse the Obligee for all outlay and expense which the Obligee may incur in making good any default of said Principal, then this Obligation shall be null and void; otherwise it shall remain in full force and effect.

Signed and sealed this _____ day of _____, A.D., 201___

Witnesses: CONTRACTOR

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

SURETY

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

(Surety must attach copy of Power of Attorney showing authority of Office or Agent to execute bonds)

FINAL LIEN AND CLAIM WAIVER AND AFFIDAVIT

Upon receipt of the sum of _____, which sum represents the total amount paid, including the current payment for work done and materials supplied for Project No. _____, in _____, Maine, under the undersigned's Contract with the Maine Turnpike Authority.

The undersigned, on oath, states that the Final Payment of _____ is the final payment for all work, labor, materials, services and miscellaneous (all of which are hereinafter referred to as "Work Items") supplied to the said Project through _____and that no additional sum is claimed by the undersigned respecting said Project.

The undersigned, on oath, states that all persons and firms who supplied Work Items to the undersigned in connection with said Project have been fully paid by the undersigned for such Work Items or that such payment will be fully effected immediately upon receipt of this payment.

In consideration of the payment herewith made, the undersigned does fully and finally release and hold harmless the Maine Turnpike Authority, and its Surety, if any, from any and all claims, liens or right to claim or lien, arising out of this Project under any applicable bond, law or statute.

It is understood that this Affidavit is submitted to assure the Owner and others that all liens and claims relating to the Work Items furnished by the undersigned are paid.

_____
(Contractor)

By: _____

Title: _____

State of MAINE

County of _____

I, _____, hereby certify on behalf of _____
(Company Officer) *(Company Name)*

its _____, being first duly sworn and stated that the foregoing representations are
(Title)

are true and correct upon his own knowledge and that the foregoing is his free act and deed in said capacity and the free act and deed of the above-named.
(Company Name)

The above-named, _____, personally appeared before me this ____ day of _____ and swears that this is his free act and deed.

(SEAL)

_____
Notary Public

My Commission Expires: _____

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART I – SUPPLEMENTAL SPECIFICATIONS

Available at: http://www.maineturnpike.com/Projects-Planning/Construction-Contracts.aspx

(Rev. November 10, 2016)

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART II – SPECIAL PROVISIONS

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART II - SPECIAL PROVISIONS

All work shall be governed by the Maine Department of Transportation Standard Specifications, Revision of November 2014, except for that work which applies to sections of the Maine Department of Transportation Standard Specifications which are amended by the Maine Turnpike Supplemental Specifications and the following modifications, additions and deletions.

General Description of Work

The work consists of intersection improvements at the intersection of Exit 47 and Rand Road and paving rehabilitation at the Exit 47 interchange in the City of Portland, Maine. The work includes widening of Rand Road and the Toll Approach Road and paving of the Exit 47 Interchange, guardrail, maintenance of traffic and all other work incidental thereto in accordance with the Plans and Specifications.

Plans

The drawings included in these Contract Documents, and referred to as the Plans, show the general character of the work to be done under this Contract. They bear the general title "Maine Turnpike – Contract 2018.02 – Exit 47 Intersection Improvements, Pavement Rehabilitation, and Clear Zone Improvements - Mile 47.3". The right is reserved by the Resident to make such minor corrections or alterations in the Plans as he deems necessary without change in the unit prices on the Schedule of Prices of the Proposal.

101.2 Definition

Holidays

The following is added after Memorial Day in the Supplemental Specifications:

Christmas 2018	Noon Monday to 6:00 AM Wednesday
New Year's Day 2019	Noon Monday to 6:00 AM Wednesday
July 4th 2019	Noon Wednesday to 6:00 AM Monday

103.4 Notice of Award

The following sentence is added:

The Maine Turnpike Authority Board is scheduled to consider the Contract Award on September 6, 2018.

104.3.8 Wage Rates and Labor Laws

Section 104.3.8 Wage Rates and Labor Laws has been amended as follows:

The fair minimum hourly rates determined by the State of Maine Department of Labor for this Contract are as follows:

State of Maine
Department of Labor
Bureau of Labor Standards
Augusta, Maine 04333-0045
Telephone (207) 623-7906

Wage Determination - In accordance with 26 MRSA §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid to laborers and workers employed on the below titled project.

Title of Project --------MTA 2018.02-Exit 47 Intersection Improvements, Pavement Rehabilitation and Clear Zone Improvements

Location of Project --Portland, Cumberland County

2018 Fair Minimum Wage Rates
Highway & Earth Cumberland County

Occupation Title	Minimum Wage	Minimum Benefit	Total	Occupation Title	Minimum Wage	Minimum Benefit	Total
Asphalt Raker	$16.00	$0.44	$16.44	Ironworker – Ornamental	$23.13	$4.80	$27.93
Backhoe Loader Operator	$20.00	$2.23	$22.23	Ironworker - Reinforcing	$24.79	$10.60	$35.39
Boom Truck (Truck Crane) Operator	$21.66	$6.86	$28.52	Ironworker - Structural	$21.80	$4.88	$26.68
Bulldozer Operator	$22.30	$4.19	$26.49	Laborer (Includes Helper-Tender)	$14.50	$0.94	$15.44
Carpenter	$21.00	$2.36	$23.36	Laborer - Skilled	$17.00	$2.22	$19.22
Cement Mason/Finisher	$17.00	$0.56	$17.56	Line Erector-Power/Cable Splicer	$26.00	$7.59	$33.59
Crane Operator =>15 Tons)	$26.00	$5.97	$31.97	Loader Operator - Front-End	$19.88	$3.74	$23.62
Crusher Plant Operator	$17.75	$2.39	$20.14	Mechanic- Maintenance	$21.00	$3.15	$24.15
Diver	$28.50	$1.48	$29.98	Painter	$17.00	$0.00	$17.00
Driller -Rock	$18.38	$2.60	$20.98	Paver Operator	$18.00	$1.57	$19.57
Earth Auger Operator	$22.97	$6.17	$29.14	Pipelayer	$18.00	$3.16	$21.16
Electrician - Licensed	$26.00	$4.67	$30.67	Pump Installer	$21.00	$3.73	$24.73
Electrician Helper/Cable Puller (Licensed)	$17.00	$2.84	$19.84	Reclaimer Operator	$19.13	$2.98	$22.11
Elevator Constructor/Installer	$19.25	$1.62	$20.87	Roller Operator - Earth	$16.00	$1.89	$17.89
Excavator Operator	$21.54	$3.44	$24.98	Roller Operator - Pavement	$18.00	$2.07	$20.07
Fence Setter	$17.25	$1.72	$18.97	Screed/Wheelman	$22.88	$4.25	$27.13
Flagger	$12.50	$0.00	$12.50	Truck Driver - Light	$17.83	$3.74	$21.57
Grader/Scraper Operator	$21.33	$5.65	$26.98	Truck Driver - Medium	$18.00	$1.89	$19.89
Highway Worker/Guardrail Installer	$16.50	$0.79	$17.29	Truck Driver - Heavy	$16.50	$1.53	$18.03
Hot Top Plant Operator	$23.38	$5.55	$28.93	Truck Driver - Tractor Trailer	$19.00	$2.79	$21.79

The Laborer classifications include a wide range of work duties. Therefore, if any specific occupation to be employed on this project is not listed in this determination, call the Bureau of Labor Standards at the above number for further clarification.

Welders are classified in the trade to which the welding is incidental.

Apprentices - The minimum wage rate for registered apprentices are those set forth in the standards and policies of the Maine State Apprenticeship and Training Council for approved apprenticeship programs.

Posting of Schedule - Posting of this schedule is required in accordance with 26 MRSA §1301 et. seq., by any contractor holding a State contract for construction valued at $50,000 or more and any subcontractors to such a contractor.

Appeal - Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates.

Determination No: **HI-140-2018**

A true copy

Filing Date: **August 3, 2018**

Attest: Scott R. Cotnoir

Scott A. Cotnoir
Wage & Hour Director

Expiration Date: **12-31-2018**

BLS(Highway & Earth Cumberland)

104.4.6 Utility Coordination

This Subsection is amended by the addition of the following:

These Special Provisions outline the arrangements which have been established by the Authority for coordination of the work to be accomplished by the utilities. The scope and schedule of utility relocation work is noted herein. The Contractor shall plan and conduct his work accordingly.

General

Utility working days are Monday through Friday, conditions permitting. 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 Authority if they are exceeded.

The Contractor shall plan and conduct his operations in accordance with the following utility schedule. The Contractor must comply with all OSHA regulations pertaining to work adjacent to utility wires. The Contractor shall plan and conduct his work accordingly.

The following utilities are located within the Project limits. The Contractor shall ascertain the location of the existing utilities and any other necessary information by direct inquiry at the office of the following utility owners:

AERIAL UTILITIES

None were identified in the utility coordination process.

CENTRAL MAINE POWER (CMP)

The proposed work is out of the way of the aerial utility lines over Rand Road. The Contractor shall notify the utility company of the proposed work and coordinate if necessary.

UNDERGROUND UTILITIES

PORTLAND WATER DISTRICT:

Company Name: Portland Water District
Company Address: 225 Douglass St. Portland, ME 04104
Company Contact: Christian Rodriguez
Tel: 207-774-5961 ext. 3906
E-mail: crodriguez@pwd.org

CONSOLIDATED COMMUNICATIONS:

Company Name: Consolidated Communications
Company Address: 5 Davis Farm Road, Portland, ME 04103
Company Contact: Marty Pease

Tel: 207-797-1119
E-mail: Martin.Pease@consolidated.com

MAINE TURNPIKE AUTHORITY:

Company Name: Maine Turnpike Authority
Company Address: 2360 Congress St, Portland, ME 04102
Company Contact: Eric Barnes
E-mail: EBarnes@maineturnpike.com

104.4.7 Cooperation With Other Contractors

This Subsection is amended by the addition of the following:

Adjacent contracts tentatively scheduled for the 2018 and 2019 construction seasons include:

Maine Turnpike Authority – Portland to Scarborough paving project, MM 44.0 to MM 49.3, expected to occur fall 2018.

Maine Turnpike Authority Contract 2019.16 – Stroudwater River Overpass Bridge Improvements, MM 46.7

Maine Turnpike Authority Contract 2019.09 – MCRR Overpass Bridge Improvements, MM 47.9

The following Subsection is added:

105.8.2 Permit Requirements

A Notice of Intent (NOI), accompanied by a preliminary Limit of Disturbance (LOD) plan was submitted by the Authority to the DEP for coverage under the Maine Construction General Permit (MCGP). Compliance with the erosion and sedimentation control requirements outlined in this Contract is required by the Contractor.

The Contractor shall prepare a LOD plan illustrating the Contractor's proposed limit of earthwork disturbance. The LOD plan shall show all construction access locations, field office locations, material and temporary waste storage locations, as well as include the Contract limits of earthwork disturbance. All applicable erosion and sedimentation control devices needed shall be detailed on the Contractor's LOD plan and are not limited to those devices shown on the Contract LOD plan. **This Plan shall be submitted for review and approval, to the Resident within 14 days of Contract award.** Payment for creating, revising, and completing this plan shall be incidental to Item 659.10, Mobilization.

The LOD for this Contract, which were submitted as part of the NOI, has been estimated to be **1.79** acres; which includes an additional 0.5 acres for construction access.

At any time during the Contract, if the Limit of Disturbance needs to be adjusted to accommodate construction activities, the Contractor shall resubmit the LOD plan (including any additional erosion and sedimentation control measures needed) to the Resident for review and approval prior to any additional disturbance taking place:

- If the cumulative area of disturbance exceeds the estimated LOD noted above, by less than one acre, the Resident shall have a minimum of five (5) working days to approve the revised LOD plan.
- If the cumulative area of disturbance exceeds the estimated LOD noted above, by over one acre, the Resident shall first approve of the plan and then possibly resubmit the NOI for MaineDEP approval. The approval may take a minimum of 21 working days.

Compliance with the erosion and sedimentation control requirements outlined in this Contract is required by the Contractor.

The Contractor shall comply with the conditions outlined in the Army Corps CAT 1 Permit, the US Army Corps of Engineers General Permit, and the Maine Pollutant Discharge Elimination System General Permit for stormwater discharge associated with construction activity. The Contractor shall indemnify and hold harmless the Maine Turnpike Authority or its agents, representatives and employees against any and all claims, liabilities or fines arising from or based on the violation of the above noted permits.

This Project is also subject to the requirements of the Maine Pollutant Discharge and Elimination System (MPDES) General Permit for the Discharge of Stormwater from MTA's Municipal Separate Storm Sewer Systems (MS4), because it is located within an Urbanized Area (UA) as defined by the 2000 census by the U.S. Bureau of the Census. MS4 compliance requires all Contractors to be properly trained in Erosion and Sedimentation Control (ESC) measures (as per Special Provision Subsections 105.8.1 and 656.07) and implement measures to reduce pollutants in stormwater runoff from construction activities.

107.1 Contract Time and Contract Completion Date

This Subsection is amended by the addition of the following:

The proposed embankment widening along Rand Road, including toe berm construction, shall be completed up to the bottom of the roadway base elevation on or before November 21, 2018.

All work shall be completed on or before June 28, 2019.

107.1.1 Early Completion Bonus

This Subsection is amended by the addition of the following:

The Contractor will be paid a single lump sum early completion bonus of $25,000 for the Exit 47 Interchange Paving Work if all of the following activities are completed on or before 11:59 p.m. November 21, 2018:

1. All interchange milling, paving, striping, drainage improvements and guardrail improvements located south of the Exit 47 toll plaza.

2. All bridge paving and joint modifications specified at the Exit 47 Bridge.

3. Removal of maintenance of traffic devices not required to complete the remaining work on the project.

107.4.6 Prosecution of Work

The Contractor shall submit to the Authority a construction schedule documenting that the Contractor has the necessary labor and equipment to work immediately and continuously at the project site during periods of interchange closure. The intent of this specification is to minimize the amount of time for interchange closure, while providing the Contractor sufficient time to complete the work in a diligent manner and reopen the interchange as prescribed by the project's Completion date.

107.4.7 Limitations of Operations

Maine Turnpike / Exit 47 Interchange Traffic Control Requirements

The milling and paving at the Exit 47 Interchange shall be done between 6 p.m. and 6 a.m. with the ramps closed.

Between November 15th and April 15th all lanes and shoulders on the Exit 47 Ramps shall be fully opened to traffic and all temporary concrete barrier shall be removed with guardrail in place where required.

Maine Turnpike / Exit 47 Interchange Roadway and Clear Zone Traffic Control Requirements

The construction in each location shall proceed expeditiously. Once milling and/or paving operations commence for every day/night not worked (milling or paving) when work is allowed by Contract and weather, the Contractor will be charged a fee in the amount of $1,000 (excluding inclement weather days).

The milled surface shall have live traffic for one shift prior to any asphalt rubber mastic crack sealer work beginning.

The Contractor will be allowed to work on both roadways at the same time. The Contractor shall complete his milling operation in one location prior to beginning his milling operation in the other location unless otherwise approved by the Resident. The paving operation shall begin within seven calendar days of all milling being complete per location. The Contractor shall complete the paving operation in one location prior to beginning his paving operation in other location. The Contractor will be allowed to work in two separate work areas on each roadway providing that there is a two-mile gap between work areas. The work areas are not required to be in the same lane.

The Contractor will be allowed to mill the entire work area (location) prior to beginning the paving operation in the other location.

The Contractor shall secure all catch basin grates with Sikaflex 1a before being allowed to shift traffic onto the outside shoulder. This work will be incidental to Item 652.361.

The Contractor shall limit the milling operations such that temporary pavement markings or pavement markers are applied daily prior to the roadway being open to traffic.

Lane closures shall be as shown on the Traffic Phasing plans or as otherwise approved by the Resident. Lane closure(s) will not be allowed over a weekend or Holidays unless approved otherwise by the Resident.

The Contractor shall keep a 12-foot-wide lane open for traffic during his milling and paving operations except during periods of interchange closure, or where approved otherwise by the Resident.

Temporary bituminous ramps will be required at all butt joints.

Traffic will be allowed to traverse the longitudinal joint where the pavement is lower in one lane than the adjacent lane.

Maine Turnpike / Exit 47 Interchange Final Paving

Final paving of the portions of the Exit 47 Off Ramp located north of the toll plaza shall be completed following widening and base paving of the Off Ramp.

Maine Turnpike / Exit 47 Interchange / Rand Road Drainage and Permanent Pavement Markings

The Contractor shall schedule all drainage paths, catch basins and bituminous concrete waterways work to coincide with his work operations in the adjacent lane.

The Contractor shall place the permanent pavement markings; solid white lane edge (SWEL), solid yellow edge line (SYEL), broken white lane line(s) (BWLL), solid white lane line (SWLL) and dotted white line (DWL), on new pavement at the end of each week prior to opening the work area to traffic unless approved otherwise by the Resident.

Care shall be taken when working near catch basins to ensure foreign material and contaminants do not enter the basin. If foreign material and/or contaminants enter the basin, it shall be removed prior to the material exiting the basin into a waterway. Removal shall be completed to the satisfaction of the Resident and payment shall be incidental to the Contract.

Silt fence and/or haybales shall be used to protect the pipe outlets from all catch basins that are scheduled to be rebuilt. The quantity of silt fence and/or haybales at the outlets will be determined in the field by the Resident. The silt fence and/or hay bales will be paid for under Item 656.50, Baled Hay and Item 656.632, Temporary Silt Fence.

Rand Road Intersection Improvements and Embankment Widening

The Contractor shall keep a 12-foot-wide lane open for traffic in each direction during the proposed work operations unless approved otherwise by the Resident.

Portions of the existing Rand Road Embankments include tire-chip inclusions to minimize embankment weight and settlement. The proposed work is not expected to impact these existing tire-chip inclusions. However, the Contractor shall exercise extreme care when excavating or placing fill associated with the Rand Road embankment widening to avoid damaging or otherwise disturbing the tire chip inclusions. The Contractor shall be responsible for repairing damage or disturbance of the tire chip inclusions to the satisfaction of the Authority at no additional cost to the Authority.

The toe berm and drainage improvements proposed along the northerly side of Rand Road shall be completely constructed prior to the start of the associated embankment widening work.

The proposed embankment widening along Rand Road, including toe berm construction, shall be completed up to the bottom of the roadway base elevation on or before November 21, 2018. The embankment shall be in place for at least 5 months prior to the completion of fine grading and paving to allow for post-construction settlement of the embankment to occur.

Temporary bituminous ramps will be required at all butt joints.

Due to the presence of marine deposits, material stockpiles exceeding 10 cubic yards will not be permitted on-site to minimize the potential for slope instability.

Equipment Storage

The Contractor shall submit his proposed construction staging and storage areas for approval by the Resident.

The following Subsection is added:

107.4.8 Failure to Complete Daily Work on Time (Lane Rental)

All ramps shall be fully open to traffic for all times outside the allowed ramp closure times. The Contractor shall pay a $500.00 lane rental fee for each five (5) minute block of time or portion thereof that each lane closure remains in place outside the allowed times on each roadway.

The travel lanes shall not be opened to traffic until the pavement internal temperature has cooled to 120°F, pavement markers (temporary and/or permanent) have been installed, and all traffic control devices have been removed from the travel lanes to the satisfaction of the Resident.

SPECIAL PROVISION

SECTION 202

REMOVING STRUCTURES AND OBSTRUCTIONS

(Removing Pavement Surface-Interchange)

202.01 Description

The following sentences are added:

This work shall also consist of removing the surface of the bituminous concrete pavement in all locations to the depth, width, grade, and cross section on the mainline as shown on the Plans or as directed by the Resident. The forty-five-degree pavement safety edge needed between lanes 1 and 2 and between lane 2 and the eight foot shoulder shall be incidental to the 202 pay items.

Removal of approach pavement shall be completed through the use of a milling machine. The milling machine(s) shall be capable of accurately establishing profile grades by referencing from a floating straight edge, a minimum of 30 feet.

Areas requiring shim pavement to reach final pavement grade shall not be milled.

This work shall also consist of construction of temporary ramps at all butt joints as shown in the MaineDOT Standard Details, November 2014 Edition – Pavement Overlay Butt Joint Detail (Roadways), Page 202(01) or as approved by the Resident. The length of the temporary ramp shall be at least 1/2 L.

The following subsection is added:

202.061 Removing Pavement Surface

This Subsection is deleted and replaced with the following:

The equipment for removing the bituminous surface, excluding bridge decks, shall be a power-operated milling machine or planer capable of removing the bituminous concrete pavement to the required depth, transverse cross slope, and profile grade by use of an automated grade and slope control system. The controls shall automatically increase or decrease the pavement removal depth as required, and readily maintain desired cross slope to compensate for surface irregularities in the existing pavement course. The mill head on the machine shall have a maximum 8mm tooth spacing pattern and a minimum triple wrap configuration. The milling machine shall be capable of accurately establishing profile grades by referencing from a floating straight edge, minimum of 30± feet. The equipment shall also have an effective means for removing excess material from the surface and preventing flying material in compliance with Subsections 105.2.5 Compliance with Health and Safety Laws and 105.2.6 Convenience of the Public, of the Specification.

The Contractor shall locate, identify and remove all objects in the pavement through the work area that would be detrimental to the milling machine.

The Contractor shall be responsible for the layout of the longitudinal centerline between the travel lane and passing lane.

The finished milled surface will be inspected before being accepted, and any deviations in the profile exceeding 3/8 inch under a 16-foot string line or straightedge placed parallel to the centerline will be corrected. Any deviations in the cross slope that exceed 3/8 inch under a 10-foot string line or straightedge placed transversely to the centerline will be corrected. In no case shall the cross slope in a single lane width be inverted resulting in a depression as measured transverse to the direction of travel. Any cross slope inversions or depressions shall be corrected by spot shimming the area with HMA as directed by the resident prior to installing any leveling or wearing course. These corrections shall be done with no additional expense to the Authority.

All surplus pavement grindings, except for the amount specified above, shall be disposed of by the Contractor off the turnpike right-of-way. All grindings shall be disposed of in accordance with the Maine Department of Environmental Protection Solid Waste Management Requirements.

202.07 Method of Measurement

The removal of existing bituminous concrete pavement – mainline will be measured by the square yard of material removed to the required depth.

The following sentences are added:

Installation of temporary bituminous ramps will not be measured separately for payment, but shall be incidental to the Contract.

Removal of temporary bituminous ramps will not be measured separately for payment, but shall be incidental to the Contract.

202.08 Basis of Payment

Removing Pavement Surface – Mainline will be paid for at unit price per square yard which price shall be full compensation for removing and disposing of the bituminous and gravel materials.

Payment will be made under:

Pay Item		Pay Unit
202.2021	Removing Pavement Surface – Interchange	Square Yard

SPECIAL PROVISION

SECTION 202

REMOVING STRUCTURES AND OBSTRUCTIONS

(Removing Pavement Surface – Drainage Paths)

202.01 Description

The following paragraphs are added:

This work shall consist of grinding drainage paths in the existing inside and outside bituminous shoulders on the mainline and interchange ramps. The depth shall match the elevation of the adjacent milled travel lane. Locations and lengths of removal shall be as shown on the Plans or as directed by the Resident.

This work shall also consist of repaving the shoulder drainage paths with bituminous pavement to match the existing grades on each side of the drainage path to coincide with the paving operation of the adjacent travel lane as shown on the Plans or as directed by the Resident.

The following Subsection is added:

202.011 Materials

Grinding shall be done in accordance with Section 202.

Bituminous pavement shall conform to Section 401, Hot Mix Asphalt, 12.5 mm.

Bituminous tack coat shall conform to Section 409.

Joint sealant shall conform to Federal Specifications SS-S-1401C.

202.06 Removing Bituminous Concrete Pavement

This Subsection is deleted and replaced with the following:

The drainage paths shall be milled concurrently with the adjacent travel lane milling. The drainage paths shall be located such that they include all of any milled section of an impacted rumble strip.

The drainage paths shall be installed at the roadway low points of the sag vertical curves and at 500 foot intervals in both the outside and inside shoulders. Drainage paths shall not be installed within 500 feet of the crest of a vertical curve. The drainage paths shall extend from the edge of the milled travel lane (Lane 2) and daylight six feet into the outside shoulder and from the edge of the milled passing lane (Lane 1) and the edge of pavement (4'-0") without guardrail.

All grindings shall be disposed of in accordance with the Maine Department of Environmental Protection Solid Waste Management Requirements.

The Contractor may request that the Resident waive the requirement for the installation of drains at 500 foot intervals. The Resident will consider the weather forecast as well as the Contractor's proposed paving schedule when reviewing the request.

The tapered sides of the outside drainage paths shall be milled to form a vertical face prior to paving. The drainage paths shall be joint sealed, tack coated, and paved concurrently with the adjacent lane.

The Contractor shall not be required to replace the shoulder rumble strips removed for the drainage paths.

Vehicles will be permitted to traverse unfilled drainage paths.

202.07 Method of Measurement

The second paragraph is deleted and replaced with the following:

Removing Pavement Surface – Drainage Paths shall be measured by the square foot.

202.08 Basis of Payment

The following is added after the last paragraph:

Removing Pavement Surface – Drainage Paths shall be paid for at the Contract unit price per square foot which includes all grinding, tack coat, sealant, bituminous pavement, equipment, labor, and incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item		Pay Unit
202.2026	Removing Pavement Surface – Drainage Paths	Square Foot

SPECIAL PROVISION

SECTION 203

EXCAVATION AND EMBANKMENT

203.01 Description

The following paragraph is added:

This work shall consist of cutting, removing and disposing of the full depth of existing bituminous concrete pavement at the approaches to the bridge structures within the limits of work as shown on the Plans or as approved by the Resident. The pavement shall be sawcut to the full depth of pavement at the limits of the excavation to provide a clean, vertical cut surface.

203.04 General

The following sentence is added to the end of the third paragraph.

There are no approved waste storage areas or waste areas within the Project limits unless shown on the Plans. Unsuitable materials shall be disposed of off-site in accordance with Subsection 203.06.

All excavations shall be accomplished in accordance with the applicable OSHA Standards. The Resident reserves the right to request the Contractor to prepare an excavation plan. This plan shall include, but not necessarily be limited to, the limit and depth of excavation, side slope, shoring, trench box and utility support.

203.10 Embankment Construction - General

The thirteenth and fourteenth paragraphs are deleted and replaced with the following:

All portions of the embankment shall be compacted in accordance with the designated embankment compaction requirements specified for the Project.

The existing slopes should be benched as shown on the drawings prior to placing additional fill. Embankment fill should be placed in lifts which extend laterally beyond the limits of the design side slopes such that the specified degree of compaction is achieved within the limits of the completed embankment. The slopes should then be trimmed back to design dimensions.

203.16 Winter Construction of Embankments

The word “core” is deleted from the first and second sentences in the first paragraph.

203.18 Method of Measurement

The following paragraphs are added:

There will be no additional payment for the required excavation plan, and costs shall be incidental to the Excavation items.

SPECIAL PROVISION

SECTION 401

HOT MIX ASPHALT PAVEMENT

Section 401 of the Maine Turnpike Authority 2016 Supplemental Specifications is modified as follows:

401.01 Description

The following paragraph is added:

A Quality Control Plan(QCP) is required.

401.02 Materials

Section 401.02 is deleted in its entirety and replaced with the following:

Aggregates for HMA Pavements Coarse Aggregate and fine aggregate for HMA pavements shall be graded such that when combined in the proper proportions, including filler if required, the resultant blend will meet the composition of mixture for the type of pavement specified. Materials shall meet the requirements specified in Section 700 – Materials:

Asphalt Cement	702.01
Aggregates for HMA Pavement	703.07
RAP for HMA Pavement	703.08
HMA Mixture Composition	703.09

Mainline Surface HMA Coarse aggregate: The material retained on the No. 4 sieve, shall consist of angular fragments obtained from crushed quarry stone and be free of dirt or other objectionable materials. Coarse aggregate shall have a Micro-Deval value of 16.0 percent or less as determined by AASHTO T 327. The crushed stone shall have a maximum of 1.5% material finer than the No. 200 mesh when tested in accordance with AASHTO T-11. Flat and elongated particles shall not exceed a maximum of 8% at a 5:1 ratio in accordance with ASTM D-4791. Coarse aggregate angularity shall be a minimum of 95/90 in accordance with AASHTO T-335.

Mainline Surface HMA Fine aggregate: The material passing the No. 4 sieve, shall be crushed manufactured sand free from dirt, clay balls, or other objectionable material. Natural sand may be incorporated into the mix at a rate no greater than 13 percent by weight of total aggregate. The unconfined void content of the fine aggregate blend shall be a 45 minimum value when tested in accordance with AASHTO T-304, method A. AASHTO T-176 sand equivalent value shall be 45 minimum.

Asphalt Low Modulus Joint Sealer: Asphalt Low Modulus Joint Sealer shall be a modified asphalt and rubber compound designed for sealing and improving the strength and performance of the base asphalt cement and shall conform to ASTM D6690 Type IV and the following specifications:

Cone Penetration	90-150
Flow @ 60°C [140ºF]	3.0mm [1/8 in] max
Bond, non-immersed	Three 12.7mm [½ in] specimens pass 3 cycles @ 200% extension @ -29°C [-20ºF]
Resilience, %	60 min
Asphalt Compatibility, ASTM D5329	pass*

* There shall be no failure in adhesion, formation of any oily exudate at the interface between the sealant and asphaltic concrete or other deleterious effects on the asphaltic concrete or sealant when tested at 60°C [140ºF].

The contractor shall provide the Resident or authorized representative with a copy of the material manufacturer's recommendations pertaining to heating, application, and reheating prior to the beginning of operations or the changing of materials.

Section 401.03 Composition of Mixtures

Section 401.03 is deleted in its entirety and replaced with the following:

HMA pavement mixtures for local road and bridge projects shall be a currently approved MDOT design.

HMA pavement mixtures for Mainline paving projects shall conform to the following requirements:

The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. HMA shall be designed and tested according to AASHTO R35 and the volumetric criteria in Table 1. The Contractor shall size, uniformly grade, and combine the aggregate fractions in proportions that provide a mixture meeting the grading requirements of the Job Mix Formula (JMF). The Contractor may use a maximum of 15 percent reclaimed asphalt pavement (RAP) in any mainline surface course, and a maximum of 20 percent RAP in any base, intermediate, or shim course. Current MaineDOT approved designs with up to 20 percent RAP will be allowed on local roads.

The Contractor shall submit a job mix formula (JMF) developed for each specified mixture at least 30 days prior to placement.

The JMF shall establish a single percentage of aggregate passing each sieve size within the limits shown in Subsection 703.09. The mixture shall be designed and produced, including all production tolerances, to comply with the allowable control points for the particular type of mixture as outlined in Subsection 703.09. The JMF shall state the original source, gradation, and percentage to be used of each portion of the aggregate and mineral filler if required. It shall also state the proposed PGAB content, the name and location of the refiner, the supplier, the source of PGAB submitted for approval, the type of PGAB modification if applicable, and the location of the terminal if applicable.

In addition, the Contractor shall provide the following information with the proposed JMF:

- Properly completed JMF indicating all mix properties (Gmm, VMA, VFB, etc.).
- Stockpile Gradation Summary.
- Test reports for individual aggregate consensus properties
- Design Aggregate Structure Consensus Property Summary.
- Design Aggregate Structure Trial Blend Gradation Plots (0.45 power chart).
- Trial Blend Test Results for at least three different aggregate blends.
- Selected design aggregate blend.
- Test results for the selected design aggregate blend at a minimum of three binder contents.
- Test results for final selected blend compacted to $N_{max.}$
- Specific Gravity for the PGAB to be used.
- Recommended mixing and compaction temperatures from the PGAB supplier.
- Material Safety Data Sheets (MSDS) For PGAB.
- Asphalt Content vs. Air Voids trial blend curve.
- Test report for Contractor's Verification sample.
- Summary of RAP test results (if used), including count, average and standard deviation of binder content and gradation.

At the time of JMF submittal, the Contractor shall identify and make available the stockpiles of all proposed aggregates at the plant site. There must be a minimum of 150 ton for stone stockpiles, 75 ton for sand stockpiles, and 50 ton of blend sand before the Authority will sample. The Authority shall obtain samples for laboratory testing. The Contractor shall also make available to the Authority the PGAB proposed for use in the mix in sufficient quantity to test the properties of the asphalt and to produce samples for testing of the mixture. Before the start of paving, the Contractor and the Authority shall split a production sample for evaluation. The Contractor shall test its split of the sample and determine if the results meet the requirements. If the results are found to be acceptable, the Contractor will forward their results to the Authority's Lab, which will test the Authority's split of the sample. The results of the two split samples will be compared and shared between the Authority and the Contractor. If the Authority finds the mixture acceptable, an approved JMF will be forwarded to the Contractor. The Authority will then notify the Contractor that paving may commence. 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. The Contractor shall be allowed to submit aim changes within 24 hours of receipt of the first Acceptance test result for an individual JMF. Adjustments will be

allowed of up to 2% on the percent passing the 2.36 mm sieve through the 0.075 mm and 3% on the percent passing the 4.75 mm or larger sieves. Adjustments will be allowed on the %PGAB of up to 0.2 percent. Adjustments will be allowed on GMM of up to 0.010.

The Contractor shall submit a new JMF for approval each time a change in material source or materials properties is proposed. The same approval process shall be followed. The cold feed percentage of any aggregate except natural sand may be adjusted up to 10 percentage points from the amount listed on the JMF, however no aggregate listed on the JMF shall be eliminated. Natural sand may be adjusted up to 5 percent from the amount listed on the JMF but shall not exceed 13% by weight of total aggregates. The cold feed percentage for RAP may be reduced up to five percentage points from the amount listed on the JMF and shall not exceed the percentage of RAP approved in the JMF or for the specific application.

TABLE 1
VOLUMETRIC DESIGN CRITERIA

Design ESAL's (Millions)	Required Density (Percent of G_{mm})			Voids in the Mineral Aggregate (VMA)(Minimum Percent) Nominal Maximum Aggregate Size (mm)				Voids Filled with Binder (VFB) (Minimum %)	Fines/Eff. Binder Ratio
	$N_{initial}$	N_{design}	N_{max}	19	12.5	9.5	4.75		
10 to <30	≤89.0	96.0	≤98.0	13.5	14.5	15.5	15.5	65-80*	0.6-1.2

** For 9.5 mm nominal maximum aggregate size mixtures, the maximum VFB is 82.*

** For 4.75 mm nominal maximum aggregate size mixtures, the maximum VFB is 84.*

** For 4.75mm nominal maximum aggregate size mixtures, the Fines/Effective Binder Ratio is 0.6-1.4*

As part of the JMF submittal, there are Hamburg Wheel Tracker requirements, the Contractor shall provide the Authority the test results in accordance with AASHTO T324. The results shall be generated by a third party independent testing laboratory as approved by the Authority. The test results shall meet the requirements of Table 1A

TABLE 1A
HAMBURG WHEEL TRACKER REQUIREMENTS

Specified PG Binder Grade	Test Temperature (ºC)	Maximum Rut Depth (mm)	Minimum Number of Passes	Minimum Allowable SIP*
64-28	45	12.5	20,000	15,000
64E-28	45	8.0	20,000	15,000
70E-34	45	6.3	20,000	15,000

* As calculated by the most recently published version of the Maine DOT HWT worksheet, which is available online at http://www.maine.gov/mdot/contractors/publications/

Section 401.06 Weather and Seasonal Limitations

The first paragraph shall be deleted and replaced with:

The contractor may place Hot Mix Asphalt Pavement provided that the air temperature as determined by an approved thermometer (placed in the shade at the paving location) is 40°F or higher and the area to be paved is not frozen. The atmospheric temperature for all courses on bridge decks shall be 45°F or higher.

Section 401.08 Hauling Equipment Trucks for Hauling HMA

Add the following paragraph:

The undercarriage of haul units actively hauling HMA to the site shall be relatively free of dust / mud agglomerations. Haul units found to be contaminating the paving surface shall be removed from the site and cleaned prior to returning.

Section 401.091 Material Transfer Vehicle (MTV)

The fourth paragraph shall be deleted and replaced with:

The MTV shall be designed so that the mix receives additional mixing action.

Section 401.165 Longitudinal Joint Density

The first paragraph shall be deleted and replaced with:

When noted in Special Provision Section 403, the Authority will measure the pavement density of longitudinal joints between adjoining mainline travel lanes in both the unconfined and confined condition as determined by the days paving operation.

The eighth paragraph shall be deleted and replaced with:

The minimum density of the completed pavement shall be 92.0 percent of the theoretical maximum density obtained. Two consecutive failing tests shall result in production shut down. Prior to resuming paving operations, the contractor quality control unit shall satisfy the Authority that the paving operation will produce joint densities in compliance with the Specifications.

The eleventh paragraph and associated table shall be deleted and replaced with:

Payment reduction will be applied to each sublot that has a density lower than 92.0% as outlined below.

PERCENT COMPACTION	PERCENT PAY
92.0 or greater	100
91.9 to 90.0	95
89.9 or less	90

Section 401.17 Joints

The fourth paragraph shall be deleted and replaced with:

When required by Special Provision Section 403, Mainline Longitudinal joints shall be constructed as notched-wedge joint and constructed in a manner that will best ensure joint integrity.

Section 401.18 Quality Control

The following shall be added to section c. Quality Control Technician(s) QCT:

The QCT shall be on site during paving operations performing quality control activities. QCT's shall not act as equipment operators or laborers.

Section 401.191 Inspection/Testing

In paragraph nine delete and replace Item #8 with:

8. Secure High Speed Internet Access

SPECIAL PROVISION

SECTION 403

HOT MIX ASPHALT PAVEMENT

403.01 Description

This work shall also consist of the construction, maintenance and removal of all temporary bituminous ramps at locations as shown on the Plans or as directed by the Resident.

403.02 General

The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. The Performance Graded Asphalt Binder (PGAB) shall be polymer modified as detailed in this special provision and shall conform to the requirements of AASHTO M 332 (including Appendix 1). The PG64E-28 Binder shall contain a minimum of 2.25% Styrene-Butadiene-Styrene (SBS) polymer {BWT} in a homogeneous blend with a minimum average percent recovery of 75% as determined by AASHTO T350 @ 3.2 kPA (R3.2) on RTFO residue at 64ºC to assure significant polymer load and performance. The stability of the modified binder shall be verified in accordance with ATSM D7173 using the Dynamic Shear Rheometer (DSR). The DSR G*/sin(δ) results from the top and bottom sections of the ATSM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report.

403.03 Construction

All areas which have been milled or overlaid shall have a minimum length temporary ramp constructed as determined by the Resident at the milled or overlaid limits prior to opening the roadway to traffic. Temporary ramps shall be constructed using the same material as being placed on that day or as directed by the Resident. All temporary ramps are to be constructed on a sand joint. The Contractor shall be responsible for all repairs and maintenance required for the temporary ramps.

The Contractor shall be responsible for the layout of the longitudinal centerline between the travel lanes.

The sand and loose debris adjacent to the median guardrail shall be removed and disposed of by the Contractor off of Turnpike property.

The forty-five degree pavement safety edge needed between lanes 1 and 2 shall be incidental to the 202 pay items.

A minimum test strip of 100 tons placed at a nominal depth of 1 ½ inches, full lane width, shall be required. It shall be evaluated under testing requirements for mix volumetric and density. The exact location will be identified by the Authority. 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

Authority 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 and adjust plant settings prior to mainline plant production.

403.04 Method of Measurement

The construction and removal of temporary ramps on sand joints, and maintaining the ramps will not be measured separately for payment, but shall be incidental to Items 403.

The removal of sand and loose debris will not be measured separately for payment, but shall be incidental to paving items.

Hot Mix Asphalt, 12.5 mm (Polymer Modified pavement with (up to) 15% RAP, placed as a wearing surface will be measured under Item 403.2081 Hot Mix Asphalt, 12.5 mm (Polymer Modified) - RAP.

403.05 Basis of Payment

Hot Mix Asphalt, 12.5 mm (Polymer Modified) pavement with (up to) 15% RAP, placed as a wearing surface will be paid under Item 403.2081 Hot Mix Asphalt, 12.5 mm (Polymer Modified) – RAP.

The following pay items are added:

Pay Item		Pay Unit
403.2081	Hot Mix Asphalt, 12.5 mm (Polymer Modified) – RAP	Ton

SPECIAL PROVISION

SECTION 403

HOT MIX ASPHALT PAVEMENT

Course	HMA Grading	Item Number	Total Thickness	No. of Layers	Complimentary Notes

Rand Road and Toll Approach Road

Wearing	**12.5mm**	**403.2081**	**1.5”**	**1**	**A,C,F,G,H,I,J,K,L,N,O**
Intermediate	**12.5mm**	**403.213**	**1.5”**	**1**	**B,E,J,L,N**
Base	**19.0mm**	**403.207**	**3.0”**	**1**	**B,E,J,L,N**

Interchange Mill and Fill and Shim and Overlay

Wearing	**12.5mm**	**403.2081**	**1.5”**	**1**	**A,C,F,G,H,I,J,K,L,N,O**
Intermediate	**12.5mm**	**403.213**	**1.5”**	**1**	**B,E,J,L,N**
Shim	**4.75mm**	**403.212**	**½”-1”**	**1**	**B,E,J,L,N**

COMPLEMENTARY NOTES

A. The required PGAB for this mixture shall be **64E-28.**
B. The required PGAB for this mixture shall be **64-28.**
C. A maximum of 15 percent RAP may be used.
D. RAP may not be used.
E. The Maine DOT will conduct the job mix verification. 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 **75 gyrations**. (N design) Minimum and Maximum PGAB content shall not apply.
F. The MTA will conduct the job mix verification. The aggregate qualities shall meet the design traffic level of 10 to <30 million ESALS for mix placed under this contract. The design verification, Quality Control, and Acceptance tests for this mix will be performed at **75 gyrations**. (N design)
G. A material transfer vehicle (MTV) shall be used for the placement of Hot Mix Asphalt wearing surface on all roadways including acceleration and deceleration lanes and all ramps.
H. Joints shall be constructed as the “notched wedge” type in accordance with Subsection 401.17.
I. Joint density will be measured in accordance with Subsection 401.165.
J. Tack coat shall be applied between all layers of pavement at a rate of 0.04 G/SY.
K. PGAB shall conform to the provisions of 403.02 – Polymer Modified PGAB for HMA
L. The contractor shall furnish a quality control technician equipped with an approved densometer to ensure density requirements are met.
M. Hydrated Lime shall be incorporated into the mixture.
N. No vehicular loads shall be permitted on newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or

loss of fines. The newly paved area may be opened to traffic after the internal temperature of the pavement has cooled to 120° F. The Resident will test the internal temperature of the pavement and shall be the sole judge as to the opening to traffic. The period of time before opening to traffic may be extended at the discretion of the Resident. The lane closure may not be removed until the internal temperature has cooled to 120° F.

O. The warm mix/antistrip additive Zycotherm manufactured by Zydex Industries shall be incorporated into the PGAB at a rate of 0.1%.

SPECIAL PROVISION

SECTION 409

BITUMINOUS TACK COAT

409.02 Bituminous Material

This Subsection is deleted and replaced with the following:

Bituminous material shall conform to the Specifications for Emulsified Asphalt RS-1h, of the AASHTO Designation M-140.

409.05 Equipment

Add "or as determined by the Resident", after the words "gal/yd^2]" in the fourth line of the second paragraph of this Subsection.

409.06 Preparation of Surface

The following paragraph is added:

All existing pavement and shoulder areas on which bituminous concrete mixtures are to be placed shall receive a tack coat. The surface area where the tack coat is to be applied shall be dry and cleaned of all dirt, sand, and loose material. Cleaning shall be accomplished by use of revolving brooms or mechanical sweepers. Undesirable material not removed by the above means shall be cleaned by hand sweeping or scraping, or a combination of both. Small areas otherwise inaccessible may be swept with hand brooms. The tack coat shall be applied only when the existing surface is dry.

409.08 Method of Measurement

The following paragraphs are added:

Measurement will be based on delivery slips made out in duplicate by the Contractor and signed by the Resident, or his representative, at the point of delivery. One of these slips shall be retained by the Resident and one by the Contractor. Delivery slips shall be furnished by the Contractor and shall provide space for identifying the vehicle and driver, for stating the volume of material carried, the source of the material, the date, and the Resident or his representative's signature.

Material included in the delivery slips and not used or rejected shall be deducted from the amount being measured for payment. Each day's delivery slips shall be reconciled by the Contractor and the Resident within 24-hours.

Cleaning of the surface area where tack coat is to be applied shall be incidental to Item 409.15, Bituminous Tack Coat - Applied.

409.09 Basis of Payment

The following pay items are added:

Pay Item		Pay Unit
409.15	Bituminous Tack Coat – Applied	Gallon

SPECIAL PROVISION

SECTION 419

SAWING AND SEALING JOINTS IN BITUMINOUS PAVEMENT

(Sawing Bituminous Pavement)

419.01 Description

This work consists of sawing bituminous concrete pavement as shown on the Plans, as specified herein or as approved by the Resident.

419.02 General

The bituminous concrete pavement to be sawed shall be accurately marked before cutting. The marking shall be in accordance with the locations as shown on the Plans or as approved by the Resident. Cutting shall be with an approved power driven saw with an abrasive blade.

Unless otherwise noted or directed, the sawcut shall be vertical, a minimum of 3/8 inch wide, and extend to the depth as shown on the Plans.

Residue or debris from the sawing operation shall be removed immediately and legally disposed of by the Contractor.

419.03 Method of Measurement

Sawing Bituminous Pavement will be measured by the linear foot of pavement actually cut and accepted. No additional payment will be made for variations in the pavement thickness.

419.04 Basis of Payment

Sawing Bituminous Pavement will be paid for at the Contract unit price per linear foot which shall be full compensation for all materials, tools, equipment labor, and all incidentals necessary for the completion of the work to the satisfaction of the Resident. The disposal of sawcut residue shall be incidental to this item.

Payment will be made under:

Pay Item		Pay Unit
419.30	Sawing Bituminous Pavement	Linear Foot

SPECIAL PROVISION

SECTION 470

BERM DROP OFF CORRECTION

(Berm Dropoff Correction - Grindings)

470.01 Description

This work shall consist of furnishing and placing bituminous grindings to eliminate the berm dropoff along the inside and outside shoulder edges at all locations, including guardrail sections at locations shown on the plans or as directed by the Resident.

470.02 Bituminous Materials

The recycled bituminous pavement shall be reprocessed (crushed) to meet the following gradations:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieve
¾”	100
½”	95-100
No. 4	50-80
No. 50	18-28
No. 200	3-10

470.03 Method of Construction

Work under this item shall be in accordance with the details as shown on the Plans or as directed by the Resident.

At a minimum, a walk behind plate compactor shall be used for compaction. Other methods may be used upon approval by the Resident.

470.04 Method of Measurement

Berm Dropoff Correction – Grindings will be measured by the ton of Pavement grindings delivered and installed.

Material included in the delivery slips and not used or rejected shall be deducted from the amount being measured for payment.

470.05 Basis of Payment

The accepted quantity of "Berm Dropoff Correction – Grindings" will be paid for at the contract unit price per ton, which price shall include all materials, crushing to gradation range, weighing, transportation, placement, labor, equipment, and all incidentals necessary to accomplish the work.

The accepted quantity of "Berm Correction" will be paid for at the contract unit price per linear foot, which price shall include removing all materials, grading, transportation, labor, equipment, and all incidentals necessary to accomplish the work.

Payment will be made under:

Pay Item		Pay Unit
470.08	Berm Dropoff Correction – Grindings	Ton

SPECIAL PROVISION

SECTION 520

EXPANSION DEVICES – NON-MODULAR

(Asphaltic Plug Joint)

Section 520, Expansion Devices, Non-Modular, is deleted in its entirety and replaced with the following:

520.01 Description

This work consists of furnishing and installing asphaltic plug joint systems at the location(s) shown on the Plans, in accordance with these Specifications or as directed by the Resident. This work shall include furnishing, installation and removal of any bond breaking materials used to prevent asphalt pavement layers from adhering to any waterproofing membrane and any temporary header(s) installed with the intent to form the asphaltic plug joint channel, the installation of preformed joint filler and rigid insulation as shown on the plans, and any preparation required for the installation of the asphaltic plug joint.

This work shall also include having the approved manufacturer provide a qualified technical representative(s) to supervise the installation of the joint systems. The representative(s) shall instruct, train and supervise the Contractor's personnel in the proper methods of installation. All costs associated with this service shall be included in the unit price of the work.

Bridging plates for asphaltic plug joint systems shall only be used when shown on the Contract Plans.

520.02 Submittals

Prior to construction, the Contractor shall submit the following to the Resident for review and approval:

(a) Complete and detailed Shop Drawings of asphaltic plug joint system. Shop Drawing shall include information covering materials, their properties, installation procedures, storage and handling requirements, and Materials Safety Data Sheets.

(b) The resume of the manufacturer's technical representative, which shall include the representative's experience installing the asphaltic plug joint system along with the names and telephone numbers of contact persons for recent projects where technical assistance was provided.

(c) Certified test reports of the asphaltic binder, closed cell foam backer rod and the plastic compound.

(d) Certificates of Compliance for bridging plates, centering nails, and aggregate.

520.03 Materials

The asphaltic plug joints shall consist of a system including bridge joint binder material, aggregate, backer rod, elastomeric concrete header material and polysulfide joint sealant conforming to the details and dimensions shown on the Plans, in accordance with these Specifications and as directed by the Resident. Bridging plates shall only be used when shown on the Contract Plans.

The following systems are acceptable for use as asphaltic plug joints:

Thorma-Joint	Polyjoint	Koch BJS
Linear Dynamics, Inc. 400 Lannidex Plaza Parsipanny, NJ 07054	A.H. Harris 321 Ellis Street New Britain, CT 06050	Koch Materials Company P.O. Box 510 Stroud, OK 74079

Materials which are incorporated in or used in conjunction with approved asphaltic plug joint systems are as follows:

(a) Asphaltic Binder:

Binder shall meet or exceed requirements of AASHTO M301 (ASTM D3405) and consist of hot applied, thermoplastic polymeric modified asphalt with the following properties when tested in accordance with the following ASTM methods:

PROPERTY	REQUIREMENT	TEST METHOD
Softening Point, °F	180 min.	ASTM D36
Tensile Adhesion @ 77°F, %	800 min.	ASTM D3583
Ductility @ 77°F, inch	16 min.	ASTM D113
Penetration, 0.1 mm 77°F, 150 g, 5 s 0°F, 200 g, 60 s	 90 max. 10 max.	ASTM D3407
Flow 5 hrs @ 140°F, mm	3.0 max.	ASTM D3407
Bond @ -20°F	pass 3 cycles	ASTM D3407
Resilience @ 77°F, %	60 min.	ASTM D3407
Asphalt Compatibility @ 140°F	pass	ASTM D3407
Recommended Pouring Temperature, °F	380 to 390	
Safe Heating Temperature, °F	410	

(b) Backer Rod:

Backer rod shall be a cylindrical closed cell expanded polyethylene foam rod, with a diameter of 150 percent of joint opening width, capable of withstanding the temperature of the hot binder materials and meeting the manufacturer's requirements, or the following properties, whichever is more stringent:

PROPERTY	REQUIREMENT	TEST METHOD
Density, lb/ft^3	2.0 min.	ASTM D1622
Tensile Strength, psi	25 min.	ASTM D1623
Water Absorption, % of wt.	1.0 max.	ASTM C509

(c) Bridging Plate:

Bridging Plates shall be fabricated from ASTM A36 steel, shall be the thickness shown on the plans and shall be galvanized. Holes for centering nails shall be located approximately one foot on center along the centerline of plates.

(d) Centering Nail:

Nail shall be 16d or larger and hot dip galvanized in accordance with ASTM A153.

(e) Aggregates:

Aggregate shall be crushed, double-washed and dried, igneous rock and meeting the manufacturer's gradation. This aggregate shall also be used for top dressing on the finished joints.

(f) Plastic Compound:

Plastic compound used for repairing overcuts in bituminous concrete overlays shall be a two-component liquid with a synthetic resin base. It shall have a minimum viscosity of 3,500 cps at 77°F and a maximum viscosity of 65,000 cps at 25°F. The plastic compound shall be cured by the addition of a specific hardener. Sufficient hardener shall be used to cure the plastic compound in approximately 30 minutes at 77°F. It shall have sufficient strength and resiliency to withstand stresses set up by vibration, expansion and contraction due to temperature changes. It shall also be resistant to most chemicals and solvents, including most salts, acids, and hydrocarbons.

520.04 Installations

Asphaltic plug joint system shall be installed in accordance with manufacturer’s latest instructions and specifications. Manufacturer’s representatives shall be present during the entire installation to ensure satisfactory results are obtained.

Asphaltic plug joint system shall allow total joint movement for up to two inches. The installation shall be centered over the expansion joint gap as indicated on the Plans. It shall not be installed when ambient or substrate temperatures are below 40°F, when rain is imminent, or in other environmental conditions disapproved by the Resident. The area shall be free of any dirt, dust, moisture, petroleum or solvents that might contaminate the joint materials or reduce the bond of the joint system to the substrate or vertical faces. The use of compressed air and heat may be required to dry the area before installing the joint system.

The asphalt pavement layers shall be removed to the required dimensions shown on the plans. The asphalt pavement shall be sawcut to a depth that will not damage the waterproofing membrane, but permit the removal of the asphalt pavement layer. The pavement layer shall be removed in a manner that will not damage the waterproofing membrane. Bond breakers such as interlayers and fabrics, or temporary header(s) may be used as required to protect the waterproofing membrane from damage. The method of attaching any temporary header(s) to the concrete deck shall be approved by the Resident. The use of a temporary header shall not be allowed if it will need to be anchored into a precast prestressed concrete member. Should a concrete leveling course be required before installing the bridging plates, and the membrane layer is removed in the process, it shall be replaced before the asphaltic plug joint system is installed. Vertical surfaces of the asphalt pavement layers shall be cleaned to remove all water, dust, or other contaminates.

Backer rods shall be installed in expansion joint openings at a minimum of one inch depth as indicated on the Plans.

Binder shall be heated to a safe temperature as recommended by manufacturer. Heating kettles shall be equipped with continuous agitation system, temperature controller, calibrated thermometer and double steel jacket with an oil layer in between, to prevent scorching of the binder. During application, the temperature of binder shall be maintained at a minimum of 350°F. It shall be poured into expansion joint openings until it runs over edges.

If called for on the plans the bridging plates shall be placed from curb to curb on the roadway portion of expansion joints. Plates shall be centered over joint openings. Centering nails shall be placed in pre-drilled holes and hammered in to secure plates. The Contractor shall set the bridging plates in liquid asphalt binder to provide uniform bearing between the plates and the underlying concrete substrate.

Once the bridging plates are installed, liquid asphalt binder shall be poured and leveled over the bridging plates and adjacent membrane surfaces in a manner that ensures full coverage. Areas with excessive application, such as pooling of liquid, should be removed or dispersed along the joint area.

Aggregate shall be heated in a rotating drum mixer to a minimum of 350°F or as recommended by the Engineer. The thermoplastic polymeric modified asphalt Binder shall be added to the mixer to pre-coat aggregates.

Coated aggregate shall be placed into blockouts in layers as recommended by the manufacturer. Blockouts shall be overfilled with coated aggregate as required to compensate for compaction. Equipment for compaction shall be as recommended by the manufacturer. Additional thermoplastic polymeric modified asphalt binder shall be screeded over the compacted joint to fill any surface voids.

Top dressing aggregate shall be applied per the manufacturer’s recommendation.

Plastic compound shall be used for repairing overcuts in bituminous concrete. Cleaning, mixing and application shall be in conformance to the manufacturer’s instructions.

Vehicular traffic may pass over finished joints two-hours after compaction or as recommended by the manufacturer.

520.05 Method of Measurement

Asphaltic Plug Joint system will be measured by the linear foot along the top surface of installed joints to the limits as shown on the Plan. Preparation of surfaces for the proposed joint system including cutting, grinding and cleaning, will not be measured separately for payment, but shall be incidental to the Asphaltic Plug Joint pay item.

520.06 Basis of Payment

Asphaltic Plug Joint will be paid for at the Contract unit price per linear foot which price shall be full compensation for all labor, materials, equipment and incidentals required for furnishing and installing the Asphaltic Plug Joint as shown on the Plans, in accordance with these Specifications or as approved by the Resident.

The backer rod and elastomeric sealant installed up the vertical face, and across the horizontal surfaces, of bridge curbs and sidewalks will not be measured separately for payment, but shall be incidental to the Asphaltic Plug Joint pay item.

Payment will be made under:

Pay Item		Pay Unit
520.23	Asphaltic Plug Joint	Linear Foot

SPECIAL PROVISION

SECTION 526

CONCRETE BARRIER

(Temporary Concrete Barrier Type I - Supplied by Authority)

526.01 Description

The following paragraphs are added:

This work shall consist of loading, transporting, setting, resetting, removing, transporting and stacking Temporary Concrete Barrier Type I – Supplied by Authority. The barrier shall have attachments allowing individual sections to be connected into a continuous barrier.

The work also includes supplying connecting pins and furnishing and mounting retro-reflective delineators, per Subsection 526.02 and 526.03.

Concrete barriers supplied by Authority shall be available at the following location(s):

Maintenance Area	Linear Feet of Barrier
Crosby Maintenance Area Mile 45.8 Southbound	1,020’

Upon completion of the work, the Contractor shall remove and transport the barrier back to its maintenance area of origin. All barrier shall be returned, sorted and stacked according to type in locations directed by the project Resident or maintenance area foreman.

526.02 Materials

The following paragraphs are added:

e. Delineators shall be bi-directional with a minimum effective reflective area of eight square inches as approved by the Resident. The reflectors shall be methyl methacrylate and the housing of acrylonitrile butadiene styrene. Color shall be in accordance with the MUTCD.

526.021 Acceptance

The Resident shall have the authority to accept or reject all Temporary Concrete Barrier Type I – Supplied by Authority used on the Project that does not meet the requirements of this specification

526.03 Construction Requirements

The following paragraphs are added:

The Contractor shall notify the Resident prior to the scheduled pick-up and delivery of concrete barrier. No barrier shall be removed from or stacked at the Turnpike Maintenance Area without approval of the Resident.

The Contractor shall move and place barrier-utilizing methods that will not damage the barrier. Barrier that is damaged by the Contractor by failing to use proper methods shall be replaced by the Contractor at no additional cost to the Maine Turnpike Authority.

Concrete barrier supplied by the Authority consists of several different styles. Not all barriers may be compatible. The Contractor shall utilize caution when setting barrier to use identical barrier types as adjacent barrier. Non-compatible barrier that cannot be attached together shall be overlapped by a minimum of 10 feet with the blunt end on the non-traffic side of the barrier. This work will not be measured separately for payment, but shall be incidental to the concrete barrier.

Concrete barrier placed at roadway low points shall be shimmed on 1" by 2" by 2' long wood planks to allow drainage to pass under the barrier. In addition, the Resident may direct the Contractor to shim the concrete barrier at other locations to provide for proper roadway drainage. All labor, material, and equipment necessary to shim the barrier will not be measured separately for payment, but shall be incidental to the Concrete Barrier.

The removal of concrete barrier from adjacent to the travel lane may be conducted without a lane closure if it is accomplished in accordance with the following requirements:

1. Barrier is removed from the trailing end and the workmen and equipment involved in the operation are always behind the barrier. No workmen or equipment shall enter the travel lane.
2. Barrier shall be dragged away from the travel lane to at least a 30-degree angle by the use of a cable.
3. Barrier shall be lifted no more than six inches while within 10 feet of the travel lane.

Retro-Reflective Delineators shall be mounted as follows:

4. One on top of each barrier.
5. One on the traffic side of every barrier used in a taper.
6. One on the traffic side of every other barrier at regularly spaced intervals and locations.
7. Delineators shall be installed on both sides of the barrier if barrier is used to separate opposing traffic.
8. Delineators shall be physically adhered so as to withstand the force of throw from a snow plow.
9. If more than 25% of delineators in any 50 foot section of barrier fall off for any reason, the Contractor will be responsible for reinstalling all the delineators in that run at that their own cost.
10. Contractor is required to submit the installation method for review and approval to the Resident.

526.04 Method of Measurement

The following paragraphs are added:

Temporary Concrete Barrier Type I – Supplied by Authority shall be measured for payment by the lump sum.

The loading, transporting, setting, resetting, removing, transporting, sorting and stacking of the barrier, the furnishing, installation and maintenance of the barrier delineators, and furnishing and installing connector pins will not be measured separately for payment, but shall be incidental to the cost of the Barrier. Temporary storage of Concrete Barrier between construction phases, if required, will not be measured separately for payment, but shall be incidental to the cost of the Barrier. All equipment required to load, unload, transport and stack Concrete Barrier shall be supplied by the Contractor.

Any Barrier lost or damaged by the Contractor shall be replaced by the Contractor at no additional cost to the Authority.

526.05 Basis of Payment

The fifth paragraph is deleted and not replaced.

The following paragraphs are added:

Temporary Concrete Barrier Type I – Supplied by Authority will be paid for at the Contract lump sum price, complete in place. Such payment shall be full compensation for loading, transporting, setting, resetting, temporary storage, removing, transporting and stacking at the area designated, furnishing all materials, and all other incidentals necessary to complete the work. Temporary Concrete Barrier Type I – Supplied by Authority and all connecting pins shall remain the property of the Authority, and shall be returned to the Turnpike Maintenance Area as designated in Subsection 526.01.

Payment of Concrete Barrier shall be based on a percentage of the work accomplished during that pay period.

Payment will be made under:

Pay Item		Pay Unit
526.306	Temporary Concrete Barrier, Type I – Supplied by Authority	Lump Sum

SPECIAL PROVISION

SECTION 527

ENERGY ABSORBING UNIT

(Work Zone Crash Cushion)

527.01 Description

The first paragraph is deleted in its entirety and replaced with the following:

The Contractor shall furnish and install work zone crash cushions where shown on the Plans, as specified herein, in Special Provision 652, or as approved by the Resident. Work zone crash cushions are required at each exposed end of temporary concrete barrier or guardrail.

The exposed end of the concrete barrier within 30 feet of the mainline travel lane shall be protected at all times. Barrier shall not be reset until after the work zone crash cushion(s) has been set to protect the exposed end of the barrier.

527.02 Materials

The following paragraph is added:

Only work zone crash cushions meeting the NCHRP Report 350 TL-3 crash test requirements may be used on the turnpike and local roadways with posted speeds of 45 MPH or greater. Work zone crash cushions meeting the NCHRP Report 350 TL-2 crash test requirements may be used on local roadways with posted speeds of 40 MPH or less. The Contractor shall provide the Resident with documentation of the proposed work zone crash cushion's NCHRP Report 350 Crash Test Results prior to installation at the jobsite.

527.03 Construction Requirements

The following is added to the end of the first paragraph:

The design speeds for work zone crash cushions shall be 45 mph for local road and 70 mph for turnpike roadways unless otherwise noted on the Plans.

527.04 Method of Measurement

Work Zone Crash Cushions used to protect exposed ends of guardrail for steel girder erection will not be measured separately for payment, but shall be included under the Maintenance of Traffic for Steel Girder Erection item.

527.05 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
527.341	Work Zone Crash Cushions – TL-3	Unit

SPECIAL PROVISION

SECTION 603

PIPE CULVERTS AND STORM DRAINS

(Reinforced Concrete Pipe)
(Concrete Collar)
(Corrugated Polyethylene Pipe)

603.01 Description

The following paragraphs are added:

This work shall also consist of furnishing and installing Class III or Class V reinforced concrete pipe at the locations as shown on the Plans or as approved by the Resident.

This work also consists of furnishing and installing a concrete collar to join existing concrete pipe to the proposed concrete or Corrugated High Density Polyethylene (HDPE) pipe in accordance with the details as shown on the Plans. The Contractor shall note that the concrete pipe ends may be of different sizes and may not fit snugly together.

This work shall also consist of furnishing and installing various sizes of corrugated HDPE pipe, including a dual wall adaptor fitting by Hancor or an approved equal as shown on the plans. No other pipe types within the Option III alternatives will be accepted.

603.02 Materials

All Corrugated High-Density Polyethylene (HDPE) pipe for storm water and drainage systems shall meet the requirements of Subsection 706.06.

603.11 Method of Measurement

The following paragraph is added:

The Concrete Collar shall be measured by each unit installed, complete in place and accepted. This shall be full compensation for furnishing labor and materials to construct a Concrete Collar to connect the existing and proposed pipe ends in a working like manner.

Dual Wall Adapter Fitting shall be included for payment as three additional linear feet of the largest pipe involved.

603.12 Basis of Payment

Concrete Collars will be paid for at the Contract unit price each regardless of the size of the existing and proposed pipes.

Corrugated HDPE pipe will be paid for under the appropriate sized Culvert Pipe Option III pay items

Payment will be made under:

Pay Item		Pay Unit
603.155	12 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.165	15 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.1653	15 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.175	18 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.1753	18 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.195	24 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.1953	24 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.205	30 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2053	30 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.215	36 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2153	36 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.225	42 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2253	42 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.235	48 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2353	48 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.245	54 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2453	54 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.255	60 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2553	60 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.265	66 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2653	66 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.275	72 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2753	72 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.155	12 Inch Reinforced Concrete Pipe – Class III	Linear Foot
603.28	Concrete Collar	Each

SPECIAL PROVISION

SECTION 604

MANHOLES, INLETS AND CATCH BASINS

604.01 Description

This Subsection is amended by the addition of the following*:*

The Type II work shall consist of rebuilding catch basins as specified in the Specifications to grade, removing the existing unsound concrete, frame and grate, applying a bead of Elastometic sealer to the frame seat and reinstalling the existing grate in accordance with these Specifications and in reasonable close conformity with the lines and grades as shown on the Plans.

604.02 Materials

The following sentences are added:

Elastomeric sealer shall be Sikaflex 1a as manufactured by Sika or an approved equal.

Class AAA concrete shall conform to Subsection 502.05; except that the minimum cement factor shall be 750 pounds per cubic yard and the coarse aggregate size shall conform to ASTM C33 Grading 7.

The third paragraph should be deleted and replaced with:

Catch Basin Frames and Grates shall be as outlined below and be manufactured by EJ Company of Brockton, Massachusetts or an approved equal and shall meet or exceed the AASHTO M306 Loading Requirements.

Catch Basin Frames shall be manufactured by EJ Company of Brockton, Massachusetts (or an approved equal) with the following product numbers:

5521Z - 8 Inch Frame Product Number 00552111
5546Z – 6 Inch Frame Product Number 00554611
5544Z - 4 Inch Frame Product Number 00554411

Catch Basin Frames shall be 8” frames unless otherwise specified by the plans or approved by the resident.

Catch Basin Grates shall be a square holed grate as manufactured by EJ Company of Brockton, Massachusetts (or an approved equal) with the following product number:

5520M5 Grate Product Number 00552060

If a cascade catch basin grate is specified on the plans then it shall be manufactured by EJ Company of Brockton, Massachusetts (or an approved equal) with the following product numbers depending on the direction of flow:

5520M8 Product Number 00552084 or 5520M8 Product Number 00552085

604.04 Altering, Adjusting, and Rebuilding Catch Basins and Manholes

This Subsection is deleted and replaced with the following:

When adjusting the existing catch basins they shall be dismantled sufficiently to allow reconstruction in accordance with the following requirements and as shown on the Plans:

Any frame or grate damaged by the Contractor's operations shall be replaced by the Contractor at no additional cost to the Authority. Replacement frame and grate shall meet the requirements of Subsection 604.02. Damaged frames and grates shall become the property of the Contractor and shall be removed from Turnpike property.

Rebuild Catch Basin to Grade – Type II

The existing frame and grate shall be removed, stacked and reset. Remove all unsound concrete and anchor rods shall be removed to sound concrete as determined by the Resident. Install four Number 4 dowels, twelve inches in length, in each sidewall, reform catch basin to necessary grade using Class AAA concrete. The existing frame shall be reinstalled to the pavement grade as determined by the Resident.

Prior to installation of the grate, the frame shall be cleaned to accept a bead of elastomeric sealer. Sealer shall be placed in a continuous bead over the horizontal surface in accordance with the manufacturer's recommendation. The existing grate shall be reinstalled and allowed to set for a minimum of 1 ½-hour before receiving traffic loads.

604.05 Method of Measurement

The following are added after Subsection e. Grate:

Rebuild Catch Basin to Grade – Type II will be measured for payment by each unit rebuilt, secured and accepted.

Each unit includes removing and replacing a depth up to 12 inches from the bottom of the frame to the top of sound concrete in the wall. Each six inches of concrete removed and replaced over 12 inches will be measured for payment as one eighth (1/8) of a unit. Depth measurements in excess of the dimensions authorized will not be included.

604.06 Basis of Payment

The following paragraphs are added after the first paragraph:

The accepted quantity of Rebuild Catch Basin to Grade – Type II will be paid for at the Contract unit price each. This price shall be full compensation for removing existing frame and

grate, rebuilding the catch basin top to grade, reinstalling the existing frame, cleaning the horizontal surface, applying the elastomeric sealer, reinstalling the existing grate, and all other labor, equipment and materials required to complete the work.

The second paragraph is deleted and replaced with the following:

Excavation and backfill will not be measured separately for payment, but shall be incidental to the following pay items.

Bituminous concrete waterways shall be paid for under Item 459.06 or 459.061.

Sawing bituminous pavement will not be measured separately for payment, but shall be incidental to the related drainage items.

Payment will be made under:

Pay Item		Pay Unit
604.184	Rebuild Catch Basin to Grade – Type II	Each

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(31" W-Beam Guardrail – Mid-way Splice (7' Steel Posts, 8" Offset Blocks, Single Faced)
(31" W-Beam Guardrail – Mid-way Splice (8' Steel Posts, 8" Offset Blocks, Single Faced)

606.01 Description

The section is amended by the addition of the following:

This work shall consist of furnishing and installing guardrail components the required locations in accordance with the Specifications and in reasonably close conformity with the lines and grades shown on the Plans. The types of guardrail are designated as follows:

31" W-Beam Guardrail – Mid-way Splice (7' Steel Posts, 8" Offset Blocks)
31" W-Beam Guardrail – Mid-way Splice (8' Steel Posts, 8" Offset Blocks)

606.02 Materials

The section is amended by the addition of the following:

Steel posts shall be 7 feet or 8 feet long as specified in the plans.

The guardrail elements shall be per the Components' List found on Sheet No. 2 of 2 of draft Drawing SGR47 – 31" W-Beam Guardrail with Standard 8" Offset Block in the Task Force 13 Report noted above and/or as noted in the Contract Documents unless noted otherwise.

606.04 Rails

The section is amended by the addition of the following:

Height of top of rail shall be 31" measured from final grade. Height transition from 31" W-Beam, mid-spliced guardrail to existing guardrail shall occur over a 25' length.

606.08 Method of Measurement

The section is amended by the addition of the following:

31" W-Beam Guardrail – Mid-way Splice (7' Steel Posts, 8" Offset Blocks) and 31" W-Beam Guardrail – Mid-way Splice (8' Steel Posts, 8" Offset Blocks) will be paid for at the contract unit price per linear foot of rail satisfactorily installed and accepted.

606.09 Basis of Payment

The section is amended by the addition of the following:

The accepted quantity of 31” W-Beam Guardrail – Mid-way Splice (7’ Steel Posts, 8” Offset Blocks) and 31” W-Beam Guardrail – Mid-way Splice (8’ Steel Posts, 8” Offset Blocks) will be paid for at the contract unit price per linear foot of rail and shall be full compensation for furnishing all labor, equipment and materials necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
606.13	31” W-Beam Guardrail – Mid-way Splice (7’ Steel Posts, 8” Offset Blocks, Single Faced)	Linear Foot
606.131	31” W-Beam Guardrail – Mid-way Splice (8’ Steel Posts, 8” Offset Blocks, Single Faced)	Linear Foot

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Bridge Transition- Type III)

606.01 Description

The following sentence is added:

This work shall consist of furnishing and installing Type III Bridge Transitions at bridge endposts on bridges over the turnpike as shown in the Contract Documents.

The following Subsection is added:

606.071 Guardrail Attachments at Bridges

Bridge transition - Type III shall be used at bridge endpost locations as shown on the plans.

606.08 Method of Measurement

The following sentence is added:

Bridge transition - Type III will be measured by each unit of the type specified, installed and accepted.

606.09 Basis of Payment

The following paragraphs are added:

Bridge Transition - Type III will be paid for at the Contract unit price each complete in place and shall be full compensation for furnishing all labor, equipment and materials necessary to complete the work consisting of, but not necessarily limited to, the following: furnishing and installing guardrail, modifications to concrete end wall to accept terminal anchor, one terminal connector, precast concrete transition curb, including terminal connector anchorage and all other detailed accessories; furnishing and installing all required posts, rails, offset brackets, back-up plates, nuts, bolts, washers, and all other items necessary to make for a complete installation as shown on the Plans or as approved by the Resident.

Payment will be made under:

Pay Item		Pay Unit
606.1723	Bridge Transition - Type III	Each

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Reflectorized Beam Guardrail Delineator)

606.01 Description

The following paragraphs are added:

Reflectorized beam guardrail delineators shall be installed on existing guardrail to remain in place, guardrail noted to be removed, modified and reset (single and/or double rail) or new guardrail, at the locations noted on Maintenance of Traffic plans or as approved by the Resident. The delineators shall be installed prior to traffic being shifted closer to the identified guardrail run. The color for the reflective sheeting shall be silver (white) when installed on the outside shoulder and yellow when installed on the inside shoulder.

Reflectorized beam guardrail delineators shall be mounted as follows:

1. Delineators on guardrail adjacent to a shifted detour should be spaced every other guardrail post and located at the bolt in the valley of the guardrail beam.

2. On existing steel bridge rail, the delineators shall be mechanically attached towards the top, every 10 feet, and bottom, every 20 feet. Delineators shall also be mechanically attached in a similar pattern to concrete endposts that are 10 feet or longer.

3. If more than 25% of delineators in any 50 feet of guardrail, bridge rail, or endposts fall off for any reason, the Contractor will be responsible for reinstalling all delineators in that run at that their own cost.

4. In no instance shall delineators be installed on guardrail which deviates substantially from the alignment (horizontal or vertical) of the roadway or which is located more than eight feet from the edge of pavement.

5. On Tangents, mount delineators every 62.5-feet or every 10^{th} post.

6. On Curves, mount delineators every 31.25-feet or every 5^{th} post.

Exceptions and/or modifications will only be made with the approval of the Resident.

Contractor is required to submit installation method for review and approval to the Resident.

606.02 Materials

The fourth paragraph is deleted and replaced with the following:

The reflectorized beam guardrail delineators shall be fabricated from galvanized steel.

Reflective sheeting shall meet the requirements of Subsection 719.01, Reflective Sheeting – minimum ASTM Type XI; 3M™ Diamond Grade™ DG³ Reflective Sheeting Series 4000 or approved equal.

606.08 Method of Measurement

The following paragraph is added:

Reflectorized Beam Guardrail Delineators will be measured by each unit of the kind specified and installed. Maintenance and replacement of delineators will not be measured separately for payment unless otherwise approved by the Resident.

606.09 Basis of Payment

The second and third sentences in the first paragraph are deleted and replaced with the following:

Reflectorized Beam Guardrail Delineators will be paid for at the Contract unit price each when installed on existing guardrail, complete in place, which price shall be full payment for furnishing and installing all components and for all incidentals necessary to complete the installation. Reflectorized Beam Guardrail Delineators will not be paid for on new guardrail.

Payment will be made under:

Pay Item		Pay Unit
606.352	Reflectorized Beam Guardrail Delineator	Each

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Permanent Flexible Delineator Posts)

606.01 Description

The following sentence is added:

This work shall consist of furnishing and installing permanent flexible delineator posts, in accordance with these Specifications and meeting NHCRP 350 requirements, at locations as shown on the Plans or as approved by the Resident.

606.02 Materials

The following paragraphs are added:

Permanent flexible delineator posts shall be PEXCO's City Post with "Easy Spin" installation with a 4 inch anchor cup, manufactured by:

Davidson Traffic Control Products
(PEXCO)
3110 70th Ave East
Tacoma, WA 98424
Phone: (877)335-4638
FAX: (210) 734-6448

The post height shall be 48 inches and 3 inches in diameter. The post color shall be the same color as the color of the reflective strip. The post shall include a 3" x 9" reflective strip viewable from all approaching traffic and be socket mounted per manufacturers guidelines. Reflective strip material shall meet the requirements of ASTM Type IX Diamond Grade VIP (Visual Impact Performance).

606.031 Installation of Delineators

The following paragraphs are added:

Work under this item shall be in accordance with the manufacturer's directions or as approved by the Resident.

Permanent flexible delineator post bases shall have the "Easy Spin" mounting and associated socket mounted in the pavement in accordance with manufacturer's directions.

606.08 Method of Measurement

The following sentence is added:

Permanent Flexible Delineator Posts shall be measured by the single unit, complete in place and accepted.

606.09 Basis of Payment

The following paragraphs are added:

The accepted quantity of Permanent Flexible Delineator Posts will be paid for at the Contract unit price each for the number of units that are properly installed. Payment shall be full compensation for the Permanent Flexible Delineator Posts, mounting hardware, assembly components, reflective material, post installation and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
606.3531	Permanent Flexible Delineator Post	Each

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Delineator Post – Remove and Reset)
(Delineator Post - Remove and Stack)

606.01 Description

The following paragraphs are added:

This work shall also consist of furnishing and installing new delineator posts and/or removing and resetting and/or removing and stacking existing delineator posts within the Contract limits at the Crosby Maintenance Facility at Mile Marker 45.8 Southbound. The existing reflectorized delineator panels shall be removed and replaced with new reflectorized delineator panels as required by the Resident.

Existing and new delineator posts shall be located as follows, with the indicated panel:

Outside Shoulder:

- One at guardrail trailing ends (green delineator).
- Two at guardrail approach ends (one red delineator on first post and one red delineator on angle points.)

Median:

- One at guardrail trailing ends (green delineator, facing traffic).
- Two at guardrail approach ends (one red delineator on first post of CAT units, green on guard rail side, red on median opening side; and one red (both sides) delineator at angle point.)
- One at all other median guardrail angle points (red on both sides)

Other Locations:

- One at culvert outlets (green delineator).
- Twenty per mile evenly spaced at the edge of outside shoulder (white delineator).
- One at electrical junction boxes not associated with another item (red delineator).
- One at communication only junction boxes not associates with another item(orange delineator).

Delineator posts that do not exist in the locations described above, shall be supplied and installed by the Contractor. The installation of the delineator post shall include the demountable reflectorized delineator panel.

White edge delineators shall not be installed on any portion of the widened shoulder for Guardrail 350 Flared Terminal installations, and shall not be installed behind the Guardrail 350 Flared Terminal rail segments.

606.02 Materials

The following paragraphs are added:

Non-guardrail Delineator Posts shall conform to Subsection 606.02 paragraph 3.

The seventh through ninth sentences of the fourth paragraph are deleted and replaced with the following:

Reflectorized flexible guardrail markers shall be a minimum of 2-inches in diameter, a maximum of 36” in length, ovalized at the top of the post to allow application of 3 inch by 9 inch high intensity reflective sheeting, and shall be capable of recovering from repeated impacts. The flexible guardrail delineator markers shall be grey and capped at the top with a flexible rubber cap; Safe-Hit Flexible Guardrail Delineator or approved equal. Reflective material shall meet the requirements of ASTM Type IX Diamond Grade VIP (Visual Impact Performance).

The demountable reflectorized delineator panels shall meet the material requirements of Subsection 719.06. The delineator panel shall be rectangles measuring 9" x 3".

606.03 Posts

The following paragraphs are added:

The top of delineator posts shall be installed 4’ - 6” (54”)) above edge of pavement elevation. Delineators shall be installed four feet from edge of pavement except those delineating end treatments, culverts and electrical items.

Mile marker posts shall be mounted on breakaway supports. The bottom of the sign shall be 5’ - 0” (60”) above the pavement at the solid white line and shall be offset five feet from the edge of pavement.

A mock-up of the guardrail delineator posts shall be submitted to the Resident for approval prior to installation.

Any materials damaged by the Contractor’s operations shall be replaced at no additional cost to the Authority.

Top of the delineator panel shall be flush with the top of post.

606.08 Method of Measurement

The following paragraphs are added:

Delineator Posts shall be measured by each unit satisfactorily installed. Delineator Post-Removed and Reset will be measured by each unit satisfactorily removed and reset. Delineator Posts Removed and Stacked will be measured by each unit satisfactorily removed and stacked.

Mile Marker post shall be measured for payment as Delineator Post. The breakaway supports shall be incidental to the Underdrain Delineator Post pay item.

606.09 Basis of Payment

The following sentences are added:

The accepted quantity of Delineator Posts will be paid for under the Underdrain Delineator Post item, at the Contract unit price per each which price shall be full compensation for the post and specified delineator or mile marker panel, complete in place.

The accepted quantity of Delineator Post - Removed and Reset will be paid for at the Contract unit price each, which price shall be full compensation for removing and resetting the delineator panel or mile marker panel and post and all incidentals necessary to complete the work.

The accepted quantity of Delineator Posts Removed and Stacked will be paid for at the Contract unit price each, which price shall be full compensation for removing and stacking delineator panel or mile marker panel and posts and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
606.3561	Delineator Post - Remove and Reset	Each
606.3562	Delineator Post - Remove and Stack	Each

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Guardrail – Remove, Modify and Reset, Single Rail)
(Guardrail – Remove, Modify and Reset, Double Rail)
(Guardrail - Remove and Stack)
(Guardrail Adjust – Single Rail)
(Guardrail Adjust – Double Rail)

606.01 Description

The following paragraphs are added:

This work shall also consist of adjusting the height of the existing single and double rail guardrail in locations where the existing height of rail is not 30 inches. The guardrail shall be adjusted to a height of 30 inches. Existing single and double rail shall also be adjusted for lean.

The guardrail adjustment shall take place at all necessary locations; approximate locations are listed in the schedule of guardrail limits both median and outside shoulder. Exact locations for adjustment shall be determined by the Resident. If, during the course of the work, the contractor finds additional rail to be adjusted, then he shall notify the Resident, and the Resident determine if the rail is to be adjusted.

This work shall also consist of removing, stockpiling and stacking of existing single and double guardrail elements, component parts and hardware suitable for replacement as approved by the Resident. At the completion of the Contract, any unused guardrail elements, posts, component parts and hardware suitable for reuse shall remain the property of the Authority. Any guardrail elements, posts, component parts and hardware unsuitable for reuse shall become property of the Contractor.

Stockpiled materials, suitable for reuse, shall be utilized on Remove, Modify and Reset items prior to new materials being paid for.

Guardrail materials may be temporarily stockpiled at the Crosby Maintenance Facility at MM 45.8 Southbound.

This work shall consist of removing, disposing of existing guardrail elements, component parts and hardware, as directed by the Resident. All materials shall become the property of the Contractor and shall be removed from the site at the completion of the Project. The Contractor shall provide the Resident with an affidavit stating the final location of all disposed material and that the material was disposed of in accordance with the Maine Department of Environmental Protection Solid Waste Regulations.

606.02 Materials

The following paragraph is added at the end of the subsection:

New non-wood offset blocks conforming to NCHRP 350 Test Level 3 shall be installed on all guardrail being reset. The existing steel offset brackets and backup plates shall become the property of the contractor.

The following Subsection is added:

606.021 General

All existing guardrail to be raised or lowered shall be completed prior to new guardrail or end treatments being attached.

606.036 Adjusting Existing Guardrail

Any materials or galvanizing damaged by the Contractor's operations shall be replaced or touched-up at no additional cost to the Authority.

Guardrail posts shall be raised to a minimum of five inches above final elevation prior to driving post to final elevation; this applies to both raising and lowering rail.

Any given length of guardrail to be adjusted shall be done in such a way that top of rail elevations do not vary drastically between each section of guardrail. Rail height tolerance shall be 30 inches, plus 0 inches, minus 1/2 inch. The 30 inches shall be measured from the edge of pavement to the top of rail beam when within 2 feet of the edge of pavement.

Rail shall be adjusted for lean where needed. All posts shall be plumb after adjusting for lean.

When the rail tapers from one bound to the other the rail shall be adjusted to the correct height on the farthest ends and shall be adjusted towards the center of the median to create a smooth line.

Earth around each adjusted or reset post shall be raked and compacted with a minimum 8 pound hand tamper or an approved device. Holes created due to adjusting or resetting a post shall be filled with a similar surrounding material and compacted.

606.08 Method of Measurement

The following paragraphs are added:

Adjusting of both single and double rail guardrail shall be measured by the linear foot of Guardrail adjusted and accepted.

Raking and compacting the earth around each reset post with a minimum 8 pound hand tamper or an approved device, and infilling and compacting holes created due to resetting posts with a similar surrounding material wil not be paid separately, but shall be incidental to the Guardrail - Remove, Modify and Reset Pay or Guardrail - Adjust pay items.

Guardrail Remove and Stack will be measured on a linear foot basis of guardrail satisfactorily removed and stockpiled whether single rail or double rail. Single and double twisted end sections will be measured for payment on a linear foot basis as 25 feet of guardrail removed.

Guardrail removed and not reset or stacked shall be incidental to Contract Items and include all removal, disposal, equipment and labor necessary to satisfactorily complete the work.

Steel posts to replace damaged posts shall come from the stockpile of guardrail components to be disposed of, from this Contract and will not be measured separately for payment. If, in the opinion of the Resident, there are no suitable steel posts in the stockpile then steel posts will be measured for payment.

W-beam rail elements to replace damaged rail elements shall come from the stockpile of guardrail from the Remove and Stack or the guardrail to be disposed of from this Contract and will not be measured separately for payment. If, in the opinion of the Resident, there are no suitable W-beam rail elements in the stockpile then the W-beam rail elements will be measured for payment.

606.09 Basis of Payment

The following paragraphs are added:

Adjusting of single and double rail guardrail will be paid for at the Contract unit price per linear foot and shall be full compensation for furnishing all labor, equipment and materials necessary to complete the work. Guardrail Adjust will not be measured for payment until all compaction has been completed.

The accepted quantity of guardrail removal will be paid for at the Contract unit price bid, which price shall be full compensation for removing, transporting and stacking all guardrail elements, component parts and hardware, equipment, labor and all incidentals necessary to complete the work. No additional payment will be made for double rail.

Payment will be made under:

Pay Item		Pay Unit
606.3605	Guardrail – Remove, Modify, and Reset Single Rail	Linear Foot
606.3606	Guardrail – Remove, Modify, and Reset Double Rail	Linear Foot
606.369	Guardrail - Remove and Stack	Linear Foot
606.3621	Guardrail Adjust, Single Rail	Linear Foot
606.3622	Guardrail Adjust, Double Rail	Linear Foot

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Single Offset Block – W-Beam)

606.01 Description

The following paragraph is added:

This work shall consist of furnishing and installing single offset blocks at all existing guardrail beam locations that are not part of a new or remove, modify and reset location and as shown on the Contract Documents. New NCHRP 350 compliant offset block shall be installed on existing galvanized steel posts and connected to Guardrail Type 3d.

606.02 Materials

The following sentences are added:

Offset blocks shall have passed NCHRP 350 Test Level 3 and shall not be wood.

The following Subsection is added:

606.021 General

The existing median guardrail posts have four off-center bolt holes used to attach the existing steel offset blocks. The new offset blocks have two bolt holes centered on the W-beam section. The existing posts must be retrofitted to receive the new non-wood offset block assembly. Additional bolt holes required in the existing posts shall be drilled or punched but the size shall not exceed the dimension given by the manufacturer. Metal around the holes shall be cleaned and painted with a cold-applied zinc-rich paint. The holes shall not be burned with a torch.

The completed guardrail system shall be in conformance with the NCHRP 350 Test Level 3 requirements.

606.08 Method of Measurement

The following paragraphs are added:
Single Offset Block - W-Beam shall be measured per each unit installed and accepted.

606.09 Basis of Payment

The following paragraphs are added:

New Single Offset Block - W-Beam furnished and installed at specified locations will be paid for at the Contract unit price each complete in place and accepted. Payment shall be full compensation for furnishing all labor, equipment and materials necessary to complete the work

including, but not necessarily limited to, removal of existing rail beam, removal and disposal of existing offset block, drilling new holes in existing post, application of galvanized paint, furnishing and installing new non-wood offset block, removal and disposal of back-up plates, and resetting the rail beam.

Payment will be made under:

Pay Item		Pay Unit
606.471	Single Offset Block – W-Beam	Each

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Guardrail – Flared Terminal – 31" W-Beam Guardrail)

606.01 Description

The following sentences are added:

This work shall consist of furnishing and installing a FLEAT (Flared Energy Absorbing Terminal) for use with the 31" W-Beam Guardrail – Mid-way Splice (7' Steel Posts, 8" Offset Blocks, Single Faced) as manufactured by Road Systems, Inc., 1507 East 4th Street, Big Spring, Texas 79720, (915) 263-2435, and retroreflective adhesive sheeting in accordance with these Specifications and the manufacturer's installation instructions, and in reasonably close conformity with the lines and grades as shown on the Plans or as approved by the Resident.

606.02 Materials

The following sentence is added:

Guardrail – Flared Terminal – 31" W-Beam Guardrail components shall be comprised of those shown in the manufacturers installation instructions. 8" blocks shall be used.

Reflective sheeting shall meet the requirements of Subsection 719.01, Reflective Sheeting – minimum ASTM Type XI; 3M™ Diamond Grade™ DG³ Reflective Sheeting Series 4000 or approved equal, color WHITE.

The contractor shall request for the impact face object marker, black chevron on yellow background, to be included in the shipped materials when installation is on the left side of roadway.

The following Subsections are added:

606.03 Posts

Wood offset blocks shall be toe-nailed in two locations to the wood post to prevent the blocks from moving.

606.035 Construction Requirements

The Contractor shall submit a set of installation drawings to the Resident for approval. The system shall be installed in accordance with the manufacturer's recommendation and the installation drawings.

A reflective adhesive sheeting shall be applied to the nose of the FLEAT System after installation. The existing sheeting shall be replaced on FLEAT systems to be removed, modified, and reset. Color – WHITE.

606.041 Reflective Sheeting

The color for the reflective sheeting shall be silver (WHITE) when installed on the outside shoulder and shall be black chevron on yellow background only when installed on the inside shoulder.

606.08 Method of Measurement

The second paragraph is amended by the addition of: “Guardrail – Flared Terminal – 31” W-Beam Guardrail, ” after the words “Terminal section, ”.

Guardrail – Flared Terminal – 31” W-Beam Guardrail will be measured by each unit satisfactorily complete in place and accepted.

606.09 Basis of Payment

The first paragraph is amended by the addition of: “Guardrail – Flared Terminal – 31” W-Beam Guardrail, ” after the words “Terminal section, ”.

The second paragraph is amended by the addition of: “, Guardrail – Flared Terminal – 31” W-Beam Guardrail, and ” after the words “NCHRP 350 end treatments ”.

The retroreflective sheeting will not be measured separately for payment, but shall be incidental to the Guardrail – Flared Terminal – 31” W-Beam Guardrail item.

Payment will be made under:

Pay Item		Pay Unit
606.791	Guardrail – Flared Terminal – 31” W-Beam Guardrail	Each

SPECIAL PROVISION

SECTION 610

STONE FILL, RIPRAP, STONE BLANKET AND STONE DITCH PROTECTION

(Temporary Stone Check Dams)

610.01 Description

Paragraph (g) is added as follows:

(g) Stone Check Dams – Machine placed stone, including the placement, removal and storage of the stone used for temporary stone check dams.

610.032.e. Stone Check Dams

The following paragraph is added:

Stone check dams shall be constructed in accordance with the details as shown on the Plans, detailed in the MaineDOT's latest Best Management Practices, or as approved by the Resident. The stone shall be placed in one operation without special handling or handwork except to create a low point along the top gradient above the ditch flow lines.

The following Subsection is added:

610.033 Removing Stone

The stone for temporary stone check dams shall be removed after vegetation has been established in the ditches as approved by the Resident.

Any damage to the slopes and ditches caused by the removal of the stone check dams shall be repaired by the Contractor at his own expense.

The area directly under the temporary stone check dams shall be loamed, seeded and mulched immediately after the removal of the stone check dams. The loam, seed and mulch will be measured for payment under the appropriate pay items.

Stone used for temporary stone check dams shall be removed and stored and shall become the property of the Contractor at the completion of the Project.

The following Subsection is added:

610.034 Maintenance

Stone check dams shall be maintained by the Contractor. Sediment deposits behind check dams shall be removed when the depth of sediment reaches 50 percent of the check dam height.

610.05 Method of Measurement

The following paragraphs are added:

Stone for Temporary Stone Check Dams will be measured by the cubic yard complete in place. The removal and storage of the stone will not be measured separately for payment, but shall be incidental to the Temporary Stone Check Dam item. This shall include the transporting and unloading of the stone. If this stone is reused on the Project, it will be measured separately for payment under the appropriate pay item.

The removal and disposal of sediment from behind the Temporary Stone Check Dams will not be measured separately for payment, but shall be incidental to the Temporary Stone Check Dam pay item.

610.06 Basis of Payment

The following sentences are added:

The accepted quantities of stone for Temporary Stone Check Dams will be paid for at the Contract unit price per cubic yard.

Payment will be made under:

Pay Item		Pay Unit
610.181	Temporary Stone Check Dam	Cubic Yard

SPECIAL PROVISION

SECTION 613

EROSION CONTROL BLANKET

613.01 Description

This work shall also include seeding, mulching and watering the median swale and/or longitudinal flow line to the limits and width as shown on the Plans or as directed by the Resident.

613.02 Materials

The following sentences are added:

Seeding shall meet the requirements of Section 618, Seeding, Method Number 2.

Mulch shall meet the requirements of Section 619.

The following Subsection is added:

613.041 Maintenance and Acceptance

See Section 618.10 for maintenance and acceptance of seeding.

613.042 Mulch

All mulch shall be placed after the area has been seeded and prior to the installation of the Erosion Control Blanket.

613.09 Basis of Payment

The following "and mulch" is added after the words "initial seeding" in the second sentence.

SPECIAL PROVISION

SECTION 619

MULCH

(Mulch – Plan Quantity)
(Temporary Mulch)

619.01 Description

The first paragraph is modified by the addition of the following:

"as a temporary or permanent erosion control measure" after the word "mulch".

Add the following sentence at the end of the first paragraph:

Refer to Section 656 Temporary Soil and Water Pollution Control, for more information on Temporary Mulch.

619.03 General

The first paragraph is deleted and replaced with the following:

Cellulose fiber mulch shall not be used within 200 feet of a wetland or stream. The limits shall be 200 feet up station and down station of the wetland or streams as well as the slopes adjacent to the stream. The application of hay or straw mulch with an approved binder shall be used at these locations to prevent erosion.

The use of cellulose fiber mulch will only be allowed at other areas with the approval of the Resident. The Contractor may be required to demonstrate that the material may be applied in a manner that will prevent erosion and will aid in the establishment of permanent vegetation. The Resident reserves the right to require the use of hay or straw mulch at all locations if he determines that the cellulose mulch is ineffective. Cellulose fiber mulch is not acceptable for winter stabilization.

610.06 Method of Measurement

The following sentence is added:

Temporary Mulch will be paid for by the lump sum.

656.10 Basis of Payment

Temporary Mulch will be paid for at the Contract price per lump sum which shall be full compensation for furnishing and spreading the Temporary Mulch as many times as necessary as determined by the Contractor's operations and staging. The price shall also include the additional mulch netting and snow removal necessary during the winter months.

Payment will be made under:

Pay Item		Pay Unit
619.1201	Mulch – Plan Quantity	Unit
619.1202	Temporary Mulch	Lump Sum

SPECIAL PROVISION

SECTION 626

FOUNDATIONS, CONDUIT, AND JUNCTION BOXES FOR HIGHWAY SIGNING, LIGHTING AND SIGNALS

(Quazite Junction Box 36 x 24)

626.031 Conduit

The third paragraph shall be deleted and replaced with:

All junction or pull boxes shall be vehicle rated (22,000lbs) and installed as shown on the plans. Junction boxes for the traffic signal and communication conduit associated with the project shall be polymer concrete as manufactured by QUAZITE® a division of Hubbell Power Systems. The boxes shall be 36" x 24" and 21" deep. The words TRAFFIC SIGNAL or COMMUNICATION shall be stamped on the cover as noted in the Plans or directed by the Resident. All existing junction boxes in useable condition shall be removed and stacked as directed by the Resident Engineer.

The fourth paragraph shall be deleted and replaced with:

Where conduits enter exposed junction boxes, they shall be sloped to drain towards the conduit entrance holes, unless otherwise directed. All conduit ends in exposed junction boxes or in concrete foundations shall be fitted with bell ends. Weep holes of ¼ inch diameter shall be placed in all pull boxes, junction boxes, and fuse boxes.

626.033 Polyvinylchloride Conduit Installation

The following paragraph shall be added:

Exposed conduit shall be rigidly and securely fastened with acceptable fasteners or supports, as indicated on the plans or approved. Fasteners or supports shall not be placed more than 6 feet apart on centers, except as otherwise authorized. Conduits shall generally be supported by an approved spacer at the point of support, so that there is an air space between the conduit and the supporting surface. Ends of conduit runs terminating in any box without a threaded hub shall be provided with a metallic locknut and insulated bushings on the inside of the box.

626.034 Concrete Foundations

The following paragraph shall be added after the 10th paragraph:

Any concrete foundation that is damaged during placement or doesn't meet design requirements will be replaced. No repairs to the foundations will be allowed.

626.04 Method of Measurement

The following sentences are added:

Quazite junction box shall be measured by each unit in place and accepted existing or new.

626.05 Basis of Payment

The words, “polymer concrete” shall be added after the words, “precast concrete” in the second sentence of the second paragraph.

Payment will be made under:

Pay Item		Pay Unit
626.12	36" x 24" x 21" Quazite Junction Box	Each

SPECIAL PROVISION

SECTION 626

FOUNDATIONS, CONDUIT, AND JUNCTION BOXES
FOR HIGHWAY SIGNING, LIGHTING AND SIGNALS

(Horizontal Directional Drilled Conduit)

Description

Horizontal Directional Drilling (HDD) method shall be used for installation of non-metallic conduit for highway lighting, toll systems and traffic signals when specified on the project plans or approved by the Resident. It shall include furnishing of all materials, site preparation, equipment setup, pilot bore, conduit pulling through the drilled bore, installation of pull wire and fittings, site restoration, and incidental work necessary to satisfactorily install conduit at the required locations and depths.

Materials

Conduit for Horizontal Directional Drilling shall meet requirements of Section 715.03 for nonmetallic conduit. Non-metallic conduit to be installed under roadways shall be Schedule 80 or greater. Non-metallic conduit to be installed in other locations shall be Schedule 40 or greater. Conduit sections shall be joined by methods suitable for installation by HDD. Joined conduit sections must have adequate strength and flexibility to withstand the installation stresses and overburden pressures without compromising the structural stability of the conduit wall. Conduit must be able to meet the bend radius required for the proposed installation. Conduit sections shall be joined in a manner resulting in the inner surfaces being flush and even.

Construction

Prior to commencing HDD work, the Contractor shall submit a drilling work plan to the Resident for approval addressing the following, at minimum:

- Profile of the proposed bore plotted at a scale appropriate for the crossing and acceptable to the Resident;
- HDD site layout including entry and exit points;
- Drilling fluid management plan, including drilling fluid types and specifications, cleaning and recycling equipment to be used, estimated flow rates, procedures for minimizing drilling fluid escape, and the method and location for final disposal of waste drilling fluids. Material safety data sheets shall be provided for all drilling fluid additives that will be used;
- Conduit storage and handling details;
- Summary of assembly and installation procedures to be used;
- Material safety data sheets of any other potentially hazardous substances to be used;
- Response plans for possible problems that may be encountered;
- Documentation and certification of the ability of the proposed conduit to withstand installation stresses and pressures.

The HDD drill rig and auxiliary pieces of equipment shall be appropriate for the diameter and

length of conduit being installed. The power system shall provide sufficient pressure to power the drilling operations with a hydraulic system free from leakage. The directional drilling machine shall be anchored as necessary to stabilize it against excessive dislocation.

In order to minimize friction and prevent collapse of the bore hole, a soil stabilizing agent (drilling fluid) may be introduced into the annular bore space from the front end of the drill head to create a slurry. The drilling fluids shall be selected or designed for the site's specific soil and ground water conditions. The drilling fluid mixing system shall be self-contained and closed with sufficient size to mix and deliver drilling fluid to the drill head. The mixing system shall continually agitate the drilling fluid during drilling operations. The fluids delivery system shall be capable of pumping drilling fluid with sufficient volume and pressure from the mixing tank through the drill rods to the drill head.

Alignment of the bore shall be accomplished by proper orientation of the drill head as it is pushed through the ground by the drill rig. Orientation and tracking of the drill head shall be determined by using an acceptable tracking system from a transmitter located within the drill head. The HDD guidance system shall be capable of locating and tracking the drill head continuously and accurately both horizontally and vertically during the pilot bore. All equipment shall be properly calibrated before commencing the directional drilling operation.

Borehole diameter relative to the conduit diameter shall be minimized to limit potential damage from soil displacement, settlement, and heaving. When necessary, the pilot borehole may be enlarged by back reaming to accommodate conduit larger than the pilot borehole size. Back reaming may be accomplished ahead of or at the same time as pulling the conduit through the pilot borehole. The back-reamer shall be sized to create a large enough borehole to allow cuttings to transfer from the face of excavation to the surface with minimum soil displacement.

Escaping slurry or drilling fluids shall be confined at the ground surface during pull back or drilling. All drilling fluids shall be disposed of or recycled in a manner acceptable to the Maine Department of Environmental Protection. Upon completion of the HDD operation, the work site shall be cleaned of all excess slurry or spoils. Any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid, or other damage from the directional drilling operation shall be repaired by the Contractor to the satisfaction of the Resident. At the completion of the HDD conduit installation, the Contractor shall provide to the Resident marked up plans noting location, depth, and material type of all conduit installed by the Horizontal Directional Drilling method.

Method of Measurement

Horizontal Directional Drilled Conduit will be measured by the number of linear feet of conduit in place and accepted by the Resident.

Basis of Payment

Payment will be made for the total number of linear feet of Horizontal Directional Drilled Conduit and accepted at the contract price per linear foot. Payment shall include the cost of furnishing and installing the conduit; site preparation and restoration of drilling entry and exit points; removal of excavated material and drilling spoils; removal and disposal of drilling fluids and excess slurry; pull wire, fittings, grounding and bonding; test cleaning of conduit interior; and all other materials, labor, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
626.223	Horizontal Directional Drilled Conduit	Linear Foot

SPECIAL PROVISION

SECTION 627

PAVEMENT MARKINGS

(White or Yellow Pavement Marking Line)

627.01 Description

The following sentences are added:

This work shall consist of furnishing and placing the final pavement markings at locations as shown on the Plans or as directed by the Resident.

The following sentence is added:

This work shall consist of furnishing and placing pavement marking paint and temporary pavement marking paint at locations as shown on the Plans or as directed by the Resident.

627.02 Materials

The following is added before the last paragraph:

The paint for pavement markings shall be 100% acrylic waterbase paint.

627.04 General

The following is added to the third paragraph:

Dotted white lines (DWL) shall consist of alternate 3 foot painted line segments and 9 foot gaps.

Permanent pavement marking paint shall be applied at the end of each work week prior to opening the work area to traffic or as approved by the Resident.

Temporary pavement marking paint and temporary pavement markers shall be applied daily prior to opening the work area to traffic during non-work hours or as approved by the Resident.

627.08 Removing Lines and Markings

The last sentence is deleted and is not replaced.

627.09 Method of Measurement

The second and third sentences in the second paragraph are deleted and replaced with the following:

The measurement of broken white lines, both permanent and temporary and dotted white lines, will include the gaps when painted. Temporary painted pavement marking lines will be measured for payment by the linear foot.

627.10 Basis of Payment

This Subsection is deleted and replaced with the following:

The accepted quantity of white or yellow pavement marking lines will be paid at the Contract price per linear foot. This price shall include all labor and materials to furnish, and install the paint line.

The accepted quantity of broken and dotted white pavement marking lines will be paid at the Contract price per linear foot. This price shall include all labor and materials to furnish and install the paint line.

The accepted quantity of temporary white or yellow pavement marking lines will be paid at the Contract price per linear foot. This price shall include all labor and materials to furnish, install and maintain the paint marking.

Payment will be made under:

Pay Item		Pay Unit
627.712	White or Yellow Pavement Marking Line	Linear Foot

SPECIAL PROVISION

SECTION 627

PAVEMENT MARKINGS

(Temporary Raised Pavement Markers)

627.01 Description

The following sentence is added:

This work shall consist of furnishing, placing and removing temporary raised pavement markers at locations as shown on the Plans or as directed by the Resident.

627.02 Materials

The second paragraph is deleted and replaced with the following:

The temporary raised pavement markers shall be white or yellow one way markers (Type Tom W-1, Y-1, Grade WZ) as distributed by Davidson Plastics Co. (DAPCO), Kent, WA, or an approved equal. Colors shall conform to 2009 MUTCD requirements.

627.04 General

The following sentences are added:

Temporary raised pavement markers shall be used to delineate travel lanes (BWLL) after placement of the surface course (HMA 12.5 mm).

Temporary raised pavement marker that lose reflectivity, becomes broken, dislodged or missing during the life of the Contract shall be replaced by the Contractor at no additional cost to the Authority.

The spacing and number of temporary pavement markers installed as edge lines shall be the same as shown for the BWLL on the Plans for Temporary Pavement Marking.

627.09 Method of Measurement

The following sentence is added:

Temporary Raised Pavement Markers will be measured by each unit, complete in place, maintained and accepted.

627.10 Basis of Payment

The following paragraphs are added:

The accepted quantity of Temporary Raised Pavement Markers white and/or yellow will be paid for at the Contract price each. This price shall include all labor and materials to furnish, install, maintain, and remove the markers.

Payment will be made under:

Pay Item		Pay Unit
627.812	Temporary Raised Pavement Markers	Each

SPECIAL PROVISION

SECTION 627

PAVEMENT MARKINGS

(Pavement Marking Tape)
(Pavement Marking Tape – Dotted White (and Yellow) Lane Line, 6-inch Width)

627.01 Description

The following sentence is added:

This work shall consist of furnishing and placing reflective pavement marking tape in conformity with the Plans, as specified herein and as directed by the Resident.

The pavement marking tape shall be installed at all locations.

627.02 Materials

The following sentence is added:

For the Broken White Lane Line (BWLL), Pavement Marking Tape shall be 3M Stamark™ High Performance Tape Series 380AW – High Performance pavement marking tape, color- white, six (6) inch width, as manufactured by 3M of St. Paul, Minnesota.

For the Dotted White (and Yellow) Lane Line (DWLL), Pavement Marking Tape shall be 3M Stamark™ High Performance Tape Series 380I ES – High Performance pavement marking tape, color- white, six (6) inch wide and twelve (12) inch wide, as manufactured by 3M of St. Paul, Minnesota.

3M Traffic Safety Systems Division
Mr. Michael D. Allen
Tel: (401) 368-0438
Email: mdallen@mmm.com

627.04 General

The following paragraphs are added:

The tape shall be used as a supplemental broken white lane line. The tape shall be installed between the painted Broken White Lane Line (BWLL) spaced eighty (80) foot center to center as shown on the Plans. The length of the tape shall be three (3) feet.

The tape shall also be used to mark a Dotted White Lane Line (DWLL) and shall be installed on parallel deceleration and acceleration lanes at locations as noted in the Plans. On deceleration lanes, the tape shall be installed from the beginning of the full width deceleration lane and shall extend to the theoretical gore markings. On acceleration lanes, the DWLL shall extend from the theoretical gore markings to a point one-half of the total length of the acceleration lane

(including the lane taper length). Layout data is noted on the Plans. Dotted White Lane Line tape shall be three (3) foot in length and shall be spaced nine (9) feet apart. Spacing from the Solid White Lane Line (SWLL) or the Theoretical Gore Markings shall be nine (9) feet.

627.05 Preparation of Surface

The following paragraph is added:

The Contractor shall mill a groove in the pavement for each tape length to be placed ("in-and-out" pattern). Continuous grooving for installation of the tape shall not be allowed. The groove length shall be the required tape length plus 12 inches on both ends. Tape length spacing shall be as shown on the plans. The groove width for inlaid tape pavement marking shall be the pavement marking width plus 1 inch, with a tolerance of ± ¼ inch. The groove shall have a uniform depth of 150 Mils (±20 Mils). Groove position shall be a minimum of 2 inches from the edge of the pavement marking to the longitudinal pavement joint. The bottom of the groove shall have a smooth, flat finished surface. The use of gang stacked Diamond cutting blades is required for asphalt pavement surfaces. The spacers between blade cuts shall be such that there will be less than a 10 mil rise in the finished groove between the blades.

Grooves shall be clean, dry and free of laitance, oil, dirt, grease, paint or other foreign contaminants. The Contractor shall prevent traffic from traversing the grooves, and re-clean grooves, as necessary, prior to application of the primer and pavement marking tape. Depth plates shall be provided by the contractor to assure that desired groove depth is achieved.

Reference is made to 3M Information Folder 5.18 Grooving Applications, May 2011, "Application Guidelines for Pavement Marking in Grooved Pavement Surfaces."

627.09 Method of Measurements

The following paragraph is added:

The quantity of Pavement Marking Tape measured for payment will be the linear feet of tape in place and accepted. The measurement will not include the gaps.

627.10 Basis of Payment

The following paragraphs are added:

The accepted quantity of pavement marking tape will be paid for at the Contract unit price per linear foot which price shall include all material, pavement grooving, equipment, labor and incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
627.94	Pavement Marking Tape	Linear Foot
627.9411	Pavement Marking Tape – Dotted White (and Yellow) Lane Line, 6-inch Width	Linear Foot

SPECIAL PROVISION

SECTION 634

HIGHWAY LIGHTING

(Replacement LED Fixture, Installed)

634.01 Description

The following paragraph is added:

The work shall consist of verifying the voltage of existing luminaire and circuit, removing the existing luminaires from (the to remain in place) mast arm upright and furnishing and installing new LED luminaire with all new associated appurtenances at the location as shown on the Plans.

The work shall also consist of furnishing and installing new disconnect fuse kits in the base of mast arm.

The work shall also consist of furnishing and installing new wire(s) from the new disconnect fuse kit to the new LED fixture, and new wiring from the new signal cabinet to the new disconnect fuse kit.

The existing luminaire removed by the Contractor shall become property of the Contractor.

634.02 General

The following paragraphs are added:

All Contract work shall be overseen by a Maine licensed Master Electrician. The lead person for the field installations shall be either a Maine licensed Master Electrician, or a Maine licensed Journeyman Electrician. Apprentice Electricians, Helper Electricians, Journeyman-In-Training Electricians, and helpers may work under the Master or Journeyman Electrician as permitted under the law.

The Contractor shall comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical cable, wire and connectors; provide electrical cable, wire and connectors, which have been listed and labeled by Underwriters Laboratories, and comply with National Electrical Manufacturers Association/Insulated Power Cable Authorities Association Standards publications pertaining to materials, construction and testing wire cable, where applicable.

At a minimum, the Contractor shall provide the following field quality control:

- Prior to energizing, check wire for continuity of circuitry and for short circuits with ohmmeter type testing equipment. Correct malfunction when detected.
- After wire hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

634.021 Materials

The following paragraphs are added:

Disconnect fuse kits in mast arm base shall be Ideal SLK Disconnect Fuse Kit 30-S2212, or similar approved Ideal SLK Disconnect Fuse Kit. All hot and neutral wires shall be fused. Ground wires do not need to be fused.

The 120-277V Conventional Multi-Tap LED fixtures shall be one of the following:

- Model # ATB2-80BLEDE70-MVOLT-R3-NL, as manufactured from American Electric Lighting
- Satellite Series # SAT-96M-0-R-T3-525 or 600-GY-1-A-NS, as manufactured by LED Roadway Lighting of Halifax, Nova Scotia; (877) 533-5755
- LEDway Series # STR-LWY 3M HT 08 E UL SV 525 or 700 R, as manufactured by CREE, Inc., 4600 Silicon Drive, Durham, NC 27703.

No substitute 120-277V Conventional Multi-Tap LED fixtures will be considered.

The Manufacturer shall provide a minimum 5-year warranty on all fixtures, from the Project Completion date.

The luminaire shall be provided with a 3 pin NEMA receptacle, a photocell and a shorting cap.

The fixture shall be submitted and approved before the fixture is ordered. Submittals shall include Product Data sheets clearly identifying the product and accessories being proposed, Test Reports and Certifications, and Product Warranties.

634.04 Cable Installation

New wire(s) between the luminaire and disconnect fuse kit at the mast arm base and between the mast arm base and the signal control cabinet will be incidental to the Replacement LED Fixture item.

634.06 Luminaires

The second paragraph is revised to read:

The connections between the luminaires and Disconnect Fuse Kit shall be made with number 8 wires AWG copper stranded XHHW, minimum size. A 14-inch-long Teflon sleeve shall be placed over each end of each conductor in the luminaire.

634.092 Method of Measurement

The following sentence is added:

Replacement LED Fixture, Installed - will be measured per each, complete in place and accepted.

Disconnect Fuse Kit, will be incidental to the Replacement LED Fixture item.

Wiring, will be incidental to the Replacement LED Fixture item.

634.093 Basis of Payment

The following paragraphs are added:

Payment for furnishing and installing Replacement LED Fixture, Installed will be made for the accepted quantity at the Contract unit price per each, which shall include verifying the existing fixture and circuit voltage, removing and disposing the existing luminaire, furnishing and installing the new LED fixture, and all incidentals necessary to complete the work including disconnect fuse kit and wiring.

Payment will be made under:

Pay Item		Pay Unit
634.175	Replacement LED Fixture, Installed	Each

SPECIAL PROVISION

SECTION 643

TRAFFIC SIGNALS

(Temporary Traffic Signal: Exit 47 and Rand Road)

643.01 Description

The following paragraphs are added:

This work shall consist of furnishing and installing all equipment, material and all signal modifications necessary for relocating the traffic signal cabinet and mast arm at the southeasterly corner of the intersection of the Exit 47 Ramps and Rand Road per the plans and this special provision, and for the signal to function in a temporary condition for the purposes of widening the Exit 47 off ramp and until the new signal equipment can be installed.

This work shall also consist of furnishing and installing all materials, equipment, and incidentals necessary to deliver power to the temporary traffic signal and related electrical systems including but not limited to wire and cable, temporary conduit or ducts, cabinet foundation (24”x5’) equipment grounding systems, and new ground electrodes or connections to existing ground electrodes.

The exist line power will be disconnected and new power runs from the toll utility building will be installed. New electrical lines and conduit from the toll utility building to the temporary signal controller cabinet will be installed as the permanent power for the new signal and new conduit and wiring shall be used and shall be paid for under the 626.22 item. Coordination for removal of the existing line power shall be made with the Authority, the City of Portland and Central Maine Power.

New directionally drilled conduit shall be installed for use in running temporary signal wiring from the controller cabinet to the signal heads, the conduit will also be used for the permanent signal installation, and will be paid for under the 626.223 item. All wiring from the signal controller cabinet to the signal heads will be temporary and incidental to the temporary signal item. The temporary wire can be used wire and this wire shall be removed once the permanent signal is installed.

The existing vehicle detection system (loops) will be reused. The loop wire leads will be intercepted at the current cabinet location and additional loop lead wire will be field spliced (soldered, taped, rubber taped, taped again, and Scotchkote™ - all field splices will be completed by this method) and run to the relocated cabinet via the directional drilled conduit.

The relocated mast arm base and the existing mast arm base shall have ¼” stainless steel wire cloth (screen) installed and secured around to base of the mast arm covering the gap between the mast arm base and the foundation to prevent access to rodents. The material and labor to install the wire cloth shall be incidental to the temporary signal item.

Prior to the relocation of the cabinet and mast arm, the Contractor shall install all needed conduit and directionally drilled conduit, permanent and temporary wiring, temporary signal head on existing pedestal pole, temporary cabinet foundation and permanent relocated mast arm

foundation. The contractor will provide a plan for the relocation of the cabinet and mast arm one week prior to the scheduled move, and request an onsite pre-move meeting with the resident and MTA at the time of the plan submittal. The physical move of the cabinet and mast arm shall be done in no more than six hours and shall occur between 9:00 AM and 3:00 PM on the agreed upon day.

643.02 General

The first sentence is deleted and replaced with the following:

A single four section signal head with bi-modal green/yellow arrow will be added to the temporary signal system in the southwest quadrant of the intersection on the existing pedestal pole. The new temporary signal head will be mounted back to back with the existing four section signal head. All necessary mounting brackets and modification to the existing pedestal pole and signal head will be incidental to the temporary signal item.

Payment will be made under:

Pay Item		Pay Unit
643.72	Temporary Traffic Signal: Exit 47 and Rand Road	Lump Sum

SPECIAL PROVISION

SECTION 643

TRAFFIC SIGNALS

(Traffic Signal Modification: Exit 47 and Rand Road)
(Video Detection System: Supply and Install)

643.01 Description This work shall consist of furnishing and installing traffic signals at the intersection of the Maine Turnpike Exit 47 interchange and Rand Road in Portland. Work shall include traffic signal modifications and a new video detection system installation. The work shall include cabinets, poles, foundations, backfill, and all necessary fittings, cables, and components as required to make a fully functional traffic signal and video detection system.

Traffic signal terms shall be in accordance with those defined in the NEC, MUTCD, NESC, NEMA, IMSA and the ITE Standards for traffic control equipment.

643.02 Materials A list of the recommended materials required to install the system may be included as an amendment to this specification, but the Authority will give no guarantee as to the completeness of this list. Unless otherwise specified, all equipment and components shall be new and free of defects.

Electrical materials shall meet the standards herein, local and utility codes, and the National Electrical Code, where applicable.

Drawings, manufacturer's specifications and applicable catalog cuts for all materials and components shall be submitted in accordance with Section 105.7 of the Standard Specification within 21 days after award of the Contract. An additional set of final approved documents, to total 6 sets, shall be provided to the Resident.

At the conclusion of the project, three complete sets of cabinet prints and one complete set of user manuals will be provided and left in the cabinet. The cabinet prints will be an exact representation of the wiring, including field wiring, and programming that is actually present in at the time of acceptance.

643.021 Traffic Signal Heads Housings shall be constructed of die cast aluminum or polycarbonate with a smooth outer surface. Housings shall be equipped with Quick Change Kit as manufactured by GGI Road and Traffic. Housings shall be adaptable for pedestal, bracket, or rigid mast arm vertical or horizontal mounting. The assembled housing shall be dust proof and moisture proof. Each housing shall be equipped with a hinged door of die cast aluminum or polycarbonate to hold the lens and parts of the optical units. The doors shall be designed to ensure uniform pressure around the doorframe when closed. Doors shall be fastened by two hinged wing nut assemblies or other approved fasteners. Unless otherwise indicated on the plans, lenses shall be furnished with approved tunnel visors (not less than 10 inches). If either longer visors than those specified above or louvers are deemed necessary, they shall be furnished and installed. All traffic signals shall be furnished with a 5 inch backplate with a factory applied 2" diamond grade retroreflective border. Backplates shall be louvered aluminum coated flat black, be fastened with stainless steel hex head slotted screws and a 3/16 inch by 3/4 inch stainless steel fender washer. Signal housings shall be manufactured by the Econolite Group, Inc. or an approved equal.

The assembled housings shall be made up of individual sections fastened together with bolts; the assembly of sectional units shall present a smooth unbroken contour of pleasing appearance. Each end of the housing assembly shall have an opening for a 1-1/2 inch pipe nipple. The area around this opening shall be reinforced and serrated so that lock nuts will seat firmly.

One cap shall be supplied with each assembled housing to act as a cover over the hole in the top to prevent water from entering.

Housing adapters for pedestal mounting shall be constructed of cast iron. They shall be adjustable with serrated surfaces to permit the housing to be locked in the desired horizontal position. The adapters shall be secured to the bottom of the housing by means of a close nipple, shall slip fit at least 7 inches over a standard traffic signal post of 4 inches in diameter and shall be secured to the post by a minimum of four set screws. Adapters shall contain raceways from the housing to the post to protect the wires from the elements.

Mast arm brackets shall be cabled with “Astro-Brac” by Pelco or an approved equal.

LED lamps shall have a regulated power supply designed to electrically protect the diodes. The lamp shall be water tight and sealed to eliminate contaminants. The lamp shall be capable of operating at ambient air temperatures of -40° F to 140° F. LED’s shall be a 48 Volt DC LED module as manufactured by Dialight or an approved equal. All LED lamps shall have a date code not to exceed 6 months prior to the start of construction.

Each LED module shall be wired with two leads which shall terminate at the terminal block in each signal head. Separate leads shall be used to wire the block to the base. Leads shall be 18 AWG stranded wire with spade type copper terminal ends. All colors shall be bright and clearly defined and cover the insulation the entire length of the lead. The color of these leads shall be as follows:

(a) From the receptacle behind the red lens: one red wire and one white wire with an optional red tracer;

(b) From the receptacle behind the yellow lens: one yellow wire and one white wire with an optional yellow tracer;

(c) From the receptacle behind the green lens: one green wire and one white wire with an optional green tracer;

(d) From the receptacle behind the green arrow: one blue wire and one white wire with an optional blue tracer.

LED lamp life shall be a minimum of 100,000 hours of continuous operation. Power consumption for 12” indications including power supply shall not exceed 10 W.

LED modules shall conform to the standards set forth by the Institute of Transportation Engineers and shall be of the color indicated, circular in shape, with a visible diameter of approximately 12 inches.

643.03 Traffic Signal Poles, Mast Arms, and Pedestals Section 720 of the Standard Specifications shall apply unless otherwise noted.

Steel Structures. Section 720.04 of the Standard Specifications shall apply.

Concrete foundation shall be concrete Class A meeting the requirements of Section 502 of the Standard Specifications - Structural Concrete. Reinforcing steel shall meet the requirements of Section 503 of the Standard Specifications – Reinforcing Steel. The foundations shall be as shown on the plans.

Anchor bolts. Section 720.07 of the Standard Specifications shall apply.

Mast-arm structure and foundation (when required) design calculations and shop drawings shall be submitted for documentation in accordance with Section 105.7 of the Standard Specifications.

Wood Utility Poles. Section 720.10 of the Standard Specifications shall apply.

Messenger cable and guy cable shall be a minimum seven strand, 5/16 inch diameter wire with a breaking strength of 8,000 pounds, double galvanized in accordance with AASHTO M 111.

Aluminum Structures. Sections 720.01 and 720.02 of the Standard Specifications shall apply.

643.04 Traffic Signal Controllers and Cabinets. The controller shall designed to operate on 120 volt, 60 hertz (cycle) alternating current, and shall be delivered completely wired and enclosed in a weatherproof cabinet. All components shall be new, and unless noted, the use of solid state components shall be required. Controllers shall be programmable, menu driven, contain an Ethernet communication port (RJ-45 connection) and one hundred (100) logic processor commands shall be accessible from the front panel of the controller or through remote database management software. The controller shall be designed to mount to a standard EIA 19-inch rack and be 4U high. The controller shall meet, as a minimum, all applicable sections of the NEMA Standards Publications for ATC. The controller shall be a Cobalt Rackmount as manufactured by the Econolite Control Group.

643.041 Bench test. All components of the controller and cabinet shall be bench tested for a minimum of 72 continuous hours by the Contractor at the Contractor's facility prior to delivery to the project. A representative of the Authority shall verify the test check list. The Contractor shall notify the Authority at least 3 days prior to testing as to the date, time and place that tests are to be performed. Testing shall be performed by an IMSA qualified Signal Technician using a test board and in conformance with the design loads, phasing, timing and auxiliary equipment such as pre-emption phases. Any defective component shall be replaced, retested and continuous testing continued. Test results shall be documented on a check list as provided by the Authority and these results attested by the signature of the performing technician. Upon completion of satisfactory bench testing, a written approval will be supplied to the Contractor by the Engineer for delivery to the project only. This approval does not relieve the Contractor from ensuring proper operation of the equipment. The approval shall accompany the cabinet and controller when delivered to the project.

The checklist will contain the following items:

(a) Install all of the equipment into the cabinet as required per the plans and specifications.

(b) Set the phase timings of the controller in accordance with plans.

(c) Wire in 48 VDC Cabinet Test Display to the switch packs in simulation to the intersection as per the plans.

(d) Check all of the wiring connections for physical tightness.

(e) Power up the cabinet.

(f) Observe the sequences, timings and operations of the controller in conformance to the plans and specifications.

(g) Using the phase test push buttons, insert a call for a phase and observe this phase as it is being called for sequencing, timing and returning to rest condition. Only one separate call for each phase shall be used.

(h) Test the police panel switches, manual, on/off, flash/auto and test the police manual cord if present in the panel.

(i) Test for Fire Pre-emption - Optical Detector - with the receivers wired in the cabinet and using an emitter, test each fire run as per the plans. Hard Wired - Attach a temporary push button as per the plans and test each fire run as per the plans.

(j) Check exhaust fan controls by applying heat from a 100 watt lamp on an extension cord to the thermostat.

(k) Check heat lamp controls by cooling the thermostat.

(l) Check conflict monitor by testing for any conflicting Greens or Yellows by the use of a jumper wire attached to a displayed Green or Yellow and to the other non-parent Greens or Yellows to ascertain that conflicting colors are not present.

When all of the above procedures have been completed, the performing technician shall document the results on the approved form as provided by the Authority.

Upon completion of the project, a print out of the databases contained in the controller, CMU, Fire Preemption, Video Detection or any other equipment shall be provided to the Resident. The databases can be provided either via a hard copy printout or on a “thumb drive.”

643.042 Controller cabinet. Controller, timing and flashing mechanisms, circuitry, and other components shall be enclosed within a weather tight 1/8 inch thick aluminum cabinet. The housing shall be rainproof. It shall have two front doors and a minimum of one rear door, each equipped with a lock and handle. The enclosure top shall be sloped or crowned to prevent standing water. The cabinet shall be a minimum of 67 inches high and 45 inches wide x 26 inches deep (rounded to the nearest inch). All exterior seams shall be continuously welded. The exterior of the cabinet shall be natural aluminum with a clear anti-graffiti coating. The interior surface of the cabinet and door shall be painted with appliance white alkyd baked enamel paint. All conduits installed in the cabinet foundation shall be furnished with bell couplings.

The enclosure door frames shall be double-flanged out on all four sides and shall have strikers to hold tension on, and to form a firm seal between, the door gasketing and the frame. The dimension between the door edge and the enclosure external surface when the door is closed and locked shall be 0.156 inch (+/-0.08 inches). Gasketing shall be provided on all door openings and shall be dust-tight. Gaskets shall be 0.25 inches minimum thickness closed cell neoprene and shall be permanently bonded to the metal. A gasket top and side channels shall be provided to support the top gasket on the door to prevent gasket gravitational fatigue.

The latching handles shall have provision for padlocking in the closed position. Each handle shall be 0.75 inch minimum diameter stainless steel with a minimum of 0.50 inch shank. The padlocking attachment shall be placed at 4 inch from the handle shank center. An additional 4 inch minimum gripping length shall be provided.

The latching mechanism shall be a three-point draw roller type. The pushrods shall be turned edgewise at the outward supports and have a cross section of 0.25 inch thick by 0.75 inch wide minimum. Rollers shall have a minimum diameter of 0.875 inch with nylon wheels and steel ball bearings. When the door is closed and latched, the door shall be locked. The lock and lock support shall be rigidly mounted on the door. The lock shall be mounted in the upper quadrant, above the handle when in its full open position. In the locked position, the bolt throw shall extend a minimum of 0.25 inch (+/-0.03125 inches) into the latch cam area. A seal shall be provided to prevent dust or water entry through the lock opening.

The center latch cam shall be fabricated of a minimum thickness of 0.188 inch aluminum, or 11 gauge steel. The bolt surface shall horizontally cover the cam thickness. The cam shall be structured to only allow the door to open when the handle is moved toward the center of the door.

The main locks on the cabinet shall be Corbin 1548-1 and furnished with four keys as specified by the Authority. The keys shall be removable in the locked position only. The locks shall have rectangular, spacing loaded bolts.

Stainless steel hinges (two bolts per leaf) shall be provided to bolt the enclosure to the doors. Each door shall have a minimum of four hinges per door. Each hinge shall be 3.5 inch minimum length and have a fixed pin. The pin ends shall be welded to hinge and ground smooth. The pins and bolts shall be covered by the door edge and not accessible when the door is closed. A ground strap between the door and the main cabinet housing shall be required when 120 VAC devices are mounted on the door.

Front and rear doors shall be provided with catches to hold the door open at both 90 and 165 (+/-10) Degrees. The catch minimum diameter shall be 0.375 inch aluminum rods. The catches must be capable of holding the door open at 90 degrees in a 60 mph wind acting at an angle perpendicular to the plane of the door.

The housing shall be provided with 2 lifting eyes for placing the cabinet on its foundation. Each eye opening shall have a minimum diameter of 0.75 inch. Each eye shall be able to support the weight load of 1000 lbs. All bolt heads shall be tamperproof type.

A police panel assembly shall be provided to allow limited control access. The panel door shall be equipped with a lock and master police key. A compartment door lock Corbin R557565 with keyhole cover and two keys shall be furnished. The front and back of the panel shall be enclosed with a rigid metal covering so that no parts having live voltage are exposed. The panel assembly

shall have a drain to prevent water from collecting within the assembly. The drain shall be channeled to the outside. The cabinet shall have one switch provided and labeled "SIGNALS ON / OFF," one switch provided and labeled "FLASH / AUTO" and one switch provided and labeled "STOP TIME ON/ AUTO". The MANUAL CONTROL ENABLE ON / OFF switch and a receptacle for the INTERVAL ADVANCE cord shall be provided. An INTERVAL ADVANCE cord, six feet in length, shall be provided.

A standard rack cage shall be installed inside the housing for mounting of the ATC Controller Unit and cabinet assemblies. The EIA rack portion of the cage shall consist of four continuous, adjustable equipment mounting angles. The mounting angle nominal thickness shall be 11- gauge plated steel. The mounting angles shall be tapped with 10-32 threads with EIA universal spacing. The mounting angle shall comply with standard EIA-310-B and shall be supported at the top and bottom by either welded or bolted support angles to form a cage. The mounting angles shall provide holes to mount the side panels. The cage shall be bolted to the cabinet at four points via the housing cage supports and four points via associated spacer brackets (top and bottom). The cage shall be centered within the cabinet door opening(s). Cage mounting supports shall be provided on either side, level with the bottom edge of the door opening, for horizontal support and bolt attachment; side cage supports provided for the bracket cage supports; and bracket cage support attachments. Clearance between rails for mounting assemblies shall be 17.75 inch.

The louvered vent depth shall be a maximum of 0.25 inch. A removable and reusable air filter shall be housed behind the door vents. The filter filtration shall cover the vent opening area. A filter shell shall be provided that fits over the filter providing mechanical support for the filter. This shell shall be louvered to direct the incoming air downward. The shell sides and top shall be bent over a minimum of 0.25 inch to house the filter. The filter resident in its shell shall be held firmly in place with a bottom trough and spring loaded upper clamp. No incoming air shall bypass the filter. The bottom filter shall be formed into a waterproof sump with drain holes to the outside housing. The filter shall be 16 inch wide by 12 inch high by 0.875 inch thick.

Each electric fan shall be equipped with ball or roller bearings and shall have a minimum capacity of 100 cubic feet of free air delivery per minute. The fans shall be mounted within the housing and protected with a finger guard. A Fan Test switch shall be provided. The fans shall be thermostatically controlled and shall be manually adjustable to turn on between 70 degrees Fahrenheit and 140 degrees Fahrenheit with a differential of not more than 20 Fahrenheit between automatic turn on and off. The fan circuit shall be protected at 25% of the fan motor ampacity. The manual adjustment shall be graded in 20 Fahrenheit increment scale.

The cabinet trouble lights shall be a stainless steel, flex shaft type, 18 inch in length with on/off switch. Trouble lights shall be mounted on the inside of the cabinet on the hinge side of each cabinet door. The bulbs in the trouble light shall be an LED type. In addition to the trouble lights, the cabinet shall be equipped with three LED lights with fuses above each cabinet door opening and shall be activated by any of the door switches.

A telescopic slide out drawer for document storage shall be provided. The Drawer Shelf Unit shall be mounted across the EIA rails and shall have a non-conductive top, locking provision when fully extended and lip or handle for pulling. The drawer shall have the capability to handle a laptop mounted on the drawer when fully extended. In addition, the cabinet shall be supplied with 2 fixed aluminum shelves mounted to the EIA rack suitable for a laptop or other equipment.

A vehicle detector test panel shall be surface mounted on the interior side of the cabinet door; a push type test button shall be labeled and furnished for each phase. Pushing the button shall cause a detector call to be placed on the controller for as long as the button is held. Test panel wires shall be enclosed in a cable harness.

The cabinet shall be furnished with a resealable plastic print holder and 3 sets of "as built" cabinet prints showing all wiring and one copy of the intersection "as-built" drawings. Print holder shall be mounted on the inside of the door.

643.043 Input Assembly (24 or 48 Channel) The Input Assembly shall be an EIA-310B rack mounted assembly providing twelve slots of 22/44 pin PCB sockets. Two Model 2218 Serial Interface Unit (SIU2) shall be provided in its location mated to a DIN 96-pin connector. The SIU2 shall provide interface and control between the ATC Controller and the input units via system SB1/SB2. This Input Assembly shall be wired for a mix of twelve 2-channel and 4-channel devices. The right most 2 two channel slots shall be configured to support optical preemption phase selectors. The third/fourth right most two channel slot shall be configurable to support a latching pushbutton control unit (LPBCU) whose outputs shall be read by the controller as vehicle detector inputs (that can be reconfigured in the controller as pedestrian detector inputs). Detectors shall support being remapped in the controller. Either four (24 channel) or eight (48 channel) opto inputs shall be provided on the CDC connectors for pedestrian switch or other inputs which require additional isolation.

643.044 Field Input Termination Assembly. The Field Input Termination Assembly (FITA) shall be 24 channel and be vertically mounted. The FITA shall be connected to the Input Assembly and shall be located on a side wall of the cabinet enclosure. The FITA shall provide termination points to connect inputs to the CDC connector located on the Input Assembly.

Two 24-Channel Field Input Termination Assemblies shall be coupled with the 48-Channel Input Assembly.

643.045 Output Assembly. The Output Assembly shall be an EIA-310B rack mounted assembly. The Output Assembly shall house eight Model 2202-LV Universal High-Density Switch Pack / Flasher Units (HDSP-FU) providing 16 channels for 48 load circuits and shall be factory configurable for use with either 48VDC or 120VAC signal heads. One resident EDI Model 2218 Serial Interface Unit (SIU2) shall provide interface and control.

The Output Assembly shall house an EDI CMUip-2212-LV Cabinet Monitor Unit (CMUip), Struthers Dunn Model 428 Series Main Contactor, Main Contactor status indicator, Stop Time Switch, Auto/Flash Switch, and Momentary 24VDC Bypass Switch.

Output Assembly 24VDC bypass switch shall provide a momentary 24VDC voltage to the HDSPs during flash mode for troubleshooting purposes.

643.046 2.3 Field Output Termination Assembly (16 or 32 Channel). The Field Output Termination Assembly (FOTA) shall be 16 channel and connected to the 16-Channel Output Assembly via eight cable harnesses and shall house eight Model 2205 High-Density Flash Transfer Relays (HDFTR). The HDFTR and Flash Program Blocks (FPB) shall be provided to control and select the flash indicator color (red, yellow, or dark) during ATC Cabinet Flash mode. Each channel will be provided with a red, yellow and dark FPB for a total of 48 blocks.

Pluggable and replaceable Transient Protectors shall be provided at the field terminals for the protection of the HDSP-FU. A visual method shall be provided to indicate the transient protector has failed. A PTC fuse protected receptacle, configurable for 120VAC or 48 VDC shall be provided that can be used as a test power source during signal head installation.

Test connectors, in parallel with the field output terminals, shall be provided as a convenient method to attach test fixtures and intersection displays.

The FOTA shall be configurable for use with either 48VDC or 120VAC signal heads.

One FOTA shall be provided with each 16 channel cabinet, while two FOTA's shall be provided with each 32 channel cabinet.

643.047 Service Assembly. The Service Assembly shall be modular and shall be mounted on a side rail in the EIA 19" rack at the lowest position under the other assemblies. The Service Assembly shall provide the Main circuit breaker, a GFCI protected duplex outlet protected by a 15A circuit breaker, an HE1750 transient protection and noise filter device, an additional, fuse protected, AC outlet whose power source is derived after the HE1750 transient suppressor and a 12 VAC transformer for powering isolated pedestrian switch circuits.

The Service Assembly shall also provide two, main power entry terminal blocks, one for service power and one for a backup power source. Terminal blocks shall be protected with a clear polycarbonate cover. The Service Assembly shall also include a relay to provide automatic transfer switching between service and backup power sources. Power from the backup power source shall activate the relay.

643.048 Power Assembly. The Power Assembly shall be factory configurable for use with either 48VDC or 120VAC signal heads and shall have optional, internal 48VDC, power supply provides up to 600W for driving DC signal heads. The Power Assembly hall have a load shedding function to lower power consumption when cabinet is in flash and operating on battery backup and shall provide real time clock to allow initiation of time of day power saving methods. The Power Assembly shall have 16 programmable, 24VDC, I/O ports for future expansion. The Power Assembly shall house the High Density Flasher Unit with "PTC" self-resetting, fuses on each output and shall have MOV transient protection on 120VAC signal bus.

The Power Assembly shall have 5 switchable, clean, AC power outlets with "wall wart" spacing, shall have PTC self-resetting fuses and shall have Fan/ Lamp connector providing a serial interface to the cabinet's temperature / fan / lamp / door switch controller PCB

The Power Assembly shall have 3-port, NEMA SDLC hub connected to Serial Bus 2.

643.0481 Assembly Power Connectors. The Assembly Power Connectors shall provide a "universal" power interface for all assemblies in the cabinet. Each connector shall provide 120VAC, 48VDC, 24VDC, Line sync, power grounds and other logic signals. Each connector pin shall be rated for 13Amps minimum.

643.05 Cabinet Equipment The cabinet components shall include, but not be limited to the following. The cabinet will be a 48 VDC low voltage application.

643.051 Model 2202-LV Universal High-Density Switch Pack / Flasher Unit (HDSP-FU). When located in the Output Assembly, the Model 2202-LV HDSP-FU shall be:

Two channels per card with 6 outputs rated at 5 mA to 1 Amp (1-135 watts), over-current protected and load current monitored for each output. The HDSP-FU shall also be a modular PCB-based plug-in device containing six solid-state switches, 1.2" x 4.5" card format with DIN style connector, LED compatible to <2 watts, CMUip controlled output over-ride for fail-safe operation, "ID" Led for each channel driven by CMUip based trouble-shooting and Serial Bus #3 compatible.

When located in the Service Assembly, the Model 2202-LV HDSP-FU shall be: Two channels per card with 4 outputs rated at 5 mA to 2 Amps each, over-current protected, and load current monitored for each output. Each HDSP-FU shall also be a modular PCB-based plug-in device containing four solid-state switches, 1.2" x 4.5" card format with DIN style connector and support CMUip Flasher Alarm function.

643.052 Model 2212-LV Cabinet Monitor Unit (CMUip) The CMUip-2212-LV Cabinet Monitor Unit (CMUip), for a 48 volt DC cabinet, shall be a compact, pluggable and modular unit. The CMUip shall have the ability to fully monitor 32 channel output capability. The CMUip shall have Direct SB#3 communication to each HDSP-FU for field voltage and load current status, an ethernet port for diagnostics and is programmed with an interchangeable Datakey.

The CMUip shall have a built-in Diagnostic Wizard: The CMUip will analyze the ATC Controller output commands and HDSP-FU field input status; isolate whether the cabinet fault was caused by an ATC malfunction or a failure in the Output Assembly or field wiring; identify the faulty channel(s) and output directly and provide guidance on how the technician should isolate the cause of the malfunction.

643.053 Model ADU-2220 Auxiliary Display Unit (ADU) The ADU-2220 shall be a rack mounted 1U display module. 32 channels of RYG status plus a blue LED for fault status will provide a full view of the intersection signal states. The ADU shall have an LCD menu driven display to provide detailed status information.

The ADU shall contain a built-in Diagnostic Wizard that will provide a concise view of the signal states involved in the fault, pinpoints faulty signal inputs, and provides guidance on how the technician should isolate the cause of the malfunction. The ADU shall provide the ability to view status, configuration settings, voltages, currents, and event logs.

643.054 Model 2218 Serial Interface Unit (SIU) The Model 2218 Serial Interface Unit (SIU2) shall be a modular PCB-based plug-in device. A SIU shall be housed in each Input and Output Assembly. The SIU2 will be utilized to convert serial data from the ATC Controller into parallel outputs to the assembly. The SIU2 shall also convert parallel inputs from the assembly into serial data to the ATC Controller.

Each SIU will contain 54 programmable inputs / outputs as well as 4 opto-isolated inputs. Diagnostic monitoring software for the SIU shall utilize the front panel EIA-232 port. Each SIU shall have a 1.5 inch width faceplate.

643.055 Model 2248 Cabinet Power Supply (CPS) The Model 2248 Cabinet Power Supply (CPS) shall be rack mounted. The CPS shall provide, at a minimum, 5 Amps at 24 Vdc and 8 Amps at 48 Vdc. Connections shall be via a Phoenix connector.

643.056 2205 High-Density Flash Transfer Relay and Main Contactor. The High-Density Flash Transfer Relay (HDFTR) shall be a Struthers Dunn Model 2205 and shall have a hermetically sealed cover so that the unit is moisture proof to prevent contact contamination and that is insect proof (fire ant, etc.).Each HDFTR shall be constructed of a metal body, be dry nitrogen filled, shock/impact resistant, contain solid pins and shall have a LED indicator to display contact transfer position. The HDFTR shall be rated to 5 Amps @ 120 VAC switching, 10 Amps surge with a 48 VDC coil voltage.

643.057 Cabinet Configuration The cabinet configuration for this project shall consist of the following equipment:

1 each Controller, 24 Channel Input Assembly, 24 Channel Field Input Assembly, 32 Channel Output Assembly, Service Assembly, Power Bus, Cabinet Power Supply and an Auxiliary Display Unit. Two each of the 16 Channel Field Output Termination Assemblies shall be provided.

Each Output Assembly provided shall be equipped with a full complement of components (HDSP, SIU, etc.) per each assembly.

643.058 Cabinet Component Spares The following will be provided as spare equipment:

Two SIU, one 2248 Power Supply, one 2212-LV Cabinet Monitor Unit with Datakey, one Monitorkey Programming Tool, 5 High Density Flash Transfer Relays and a 48 VDC Cabinet Test Display.

643.06 Fire Pre-emption. Fire pre-emption shall be activated by optical detection equipment with optical detectors. Fire pre-emption shall clear the existing phase through a normal clearance followed by the fire phase as shown on the plans for the minimum time specified. The fire phase shall give a green in the called direction; the confirmation light shall be activated only during the fire pre-emption phase, after the call phase is satisfied. Upon release of the fire pre-emption, the controller shall provide a green to the major movement. Phase selector will be Emtrac model ST-9340. All software and cabling from the manufacturer will be supplied to the Authority to allow communication to the device with a PC.

The engineering, design, and integration of the fire pre-emption shall be by the manufacturer of the equipment, in cooperation with the supplier of the signal controller equipment. Preemption receivers will be Emtrac model 97XX series as required.

The confirmation light shall be operated by a HDSP (ie channel #9 Yellow).

Confirmation light shall be a self-contained 48 volt DC industrial strobe light beacon with a weather-resistant, fully enclosed, rugged, cast aluminum base and lexan red optic lens as manufactured by Whelen Engineering Company Inc. or an approved equal.

Optical detector locations shall be verified by the Engineer to assure optimum reception. Optical detector cable shall run unspliced from the optical detector head to the controller cabinet.

Each optical detector lead-in cable shall be marked with plastic tape. The fire preemption shall correspond to the following chart associating the fire preemption call with its corresponding phase:

PREEMPTION PHASE CODE

Preempt 3	Phases 1 & 6
Preempt 4	Phases 2 & 5
Preempt 5	Phases 3 & 8
Preempt 6	Phases 4 & 7

643.07 Video Detection. The work shall consist of furnishing and installing a video detection system (Econolite Autoscope Vision video-based vehicle detection system – no approved equals) at the traffic signals located at the intersections of Rand Road / Route 25 and the Maine Turnpike Exit 47 (I-95) interchange ramps. The following subsections shall be added:

643.071 System Hardware. The video detection system shall be comprised of two major hardware components: a video sensor and a communications interface panel. An optional wired input/output card shall be available for certain cabinet types.

643.0711 Video Sensor. The video detection system shall include a video sensor that integrates a high-definition (HD) camera with an embedded processor for analyzing the video and performing detection. Each video sensor shall maintain a time-stamped operations log of routine and special events in non-volatile memory for later retrieval and analysis.

643.0712 Camera and Processor. The camera shall be a color CMOS imaging array and shall have HD resolution of at least 720p (1280x720 pixels). The camera shall include a minimum 10X optical zoom. It shall be possible to zoom the lens as required to satisfy across-the-intersection detection objectives, including stop line and advance detection. It shall be possible to zoom the lens remotely from the TMC for temporary traffic surveillance operations or to inspect the cleanliness of the faceplate. The camera shall have direct, real-time iris and shutter speed control by the integrated processor. The processor shall support H.264 video compression for streaming output. The system shall include one spare camera.

643.0713 Video Sensor Enclosure Assembly The camera and processor shall be housed in a sealed IP-67 enclosure. The faceplate of the enclosure shall be glass and shall have hydrophilic coating on the exterior surface to reduce debris accumulation and maintenance and shall have a thermostatically-controlled indium tin oxide (ITO) heater applied directly on the interior surface to keep the faceplate clear of condensation, snow, ice and frost. An adjustable aluminum visor shall shield the faceplate from the sun and extraneous light sources. An integral aiming sight shall assist in aiming the camera for the detection objectives. A removable rear cap and cable strain relief shall seal the power connection and shall be tethered to the enclosure to avoid dropping the cap during installation. The rear cap shall be fastened to the body of the video sensor with a single, captive bolt. The rear cap and enclosure shall include Gore breathers to equalize internal and external pressure. The sensor shall be self-supporting on manufacturer's mounting brackets for easier fastening during installation. It shall be possible to rotate the field-of-view 360° without changing the angle of the visor.

643.0714 Power and Communications Power and communications for the video sensor shall be carried over a single three-conductor cable. Termination of the three-conductor cable shall be inside the rear cap of the enclosure on a three-position, removable Phoenix terminal block. Each conductor shall be attached to the Phoenix plug via a screw connection. The video sensor shall operate normally over an input voltage range of 89 to 265 VAC at 50 or 60 Hz. Power consumption shall be no more than 16 watts typical. No supplemental surge suppression shall be required outside the cabinet. All communications to the video sensor shall be broadband-over-power via the same three-conductor cable that powers the unit. Coaxial cable shall not be required.

643.072 Communications Interface Panel The video detection system shall include an interface panel in the traffic cabinet that manages communications between the video sensors, the traffic management center, a maintenance technician, and the traffic cabinet itself. The communications interface panel shall maintain a time-stamped operations log of routine and special events in non-volatile memory for later retrieval and analysis. The system provided shall include one spare Communications Interface Panel.

643.0721 Video Sensor Connection The communications interface panel shall provide connection points for four video sensors, each sensor connection shall be a 3-pole terminal block, which supplies power and broadband-over-power communications to the sensor. The broadband-over-power communications shall provide a throughput of 70 to 90 Mbps and shall support at least 1,000 feet of cabling to the video sensor. Each video sensor connection shall include a power switch and there shall be an LED for each video sensor to indicate the state of the power to the sensor and an LED for each video sensor to indicate the status of communications. Each video sensor connection shall contain a resettable fuse. Each video sensor connection shall provide high-energy transient protection.

643.0722 Traffic Management Center (TMC) Communications. An Ethernet port capable of supporting 10/100/1000 Mbps communication shall be provided to connect to a remote Traffic Management Center (TMC). The communications interface panel shall proxy all network requests that arrive on the TMC connection to avoid unwanted network traffic from reaching the broadband-over-power network between the communications interface panel and the video sensors. All communications to the video detection system through the TMC connection shall be to a single IP address.

643.0723 Local User Communications. A wired Ethernet port capable of supporting 10/100/1000 Mbps communications shall be provided to connect the technician at the cabinet to the video detection system for setup and maintenance purposes. All communications to the video detection system through the maintenance port shall be to a single IP address. The maintenance port shall support DHCP to automatically assign an IP address to the user's computer, if desired. An 802.11g Wi-Fi access point shall allow wireless connection to the video detection system at the cabinet for setup and maintenance purposes. All communications to the video detection system through the Wi-Fi access point shall be to a single IP Address. The Wi-Fi access point shall support DHCP to automatically assign an IP Address to the user's computer. The Wi-Fi access point shall include a dipole, omnidirectional antenna. A momentary pushbutton shall allow the user to turn the Wi-Fi access point on or off. The Wi-Fi access point shall turn itself off automatically after a period of inactivity from connected devices. An LED shall indicate when the Wi-Fi access point is enabled. The Wi-Fi access point shall operate simultaneously with the wired maintenance port and with the TMC connection.

643.0724 Traffic Controller Connection. The communications interface panel shall provide one connection to communicate to the traffic controller through the cabinet. The traffic controller connection shall support a TS2 Type 1 compatible SDLC interface utilizing a 15-pin female metal shell D subminiature type connector to support a standard NEMA TS2 or TEES SDLC cable. The traffic controller connection shall support a protocol interface to SDLC capable traffic controllers (NEMA or TEES). The traffic controller connection shall support the NEMA TS2 SDLC protocol to include up to 64 detector outputs and 32 inputs. The traffic controller connection shall be able to connect to a wired input/output card, which supports wired I/O in cabinets without a SDLC-capable controller. The wired I/O data communications link shall support at least 24 outputs and 16 inputs. It shall be possible to connect and use both SDLC communications and communication to the wired input/output card simultaneously.

643.0725 USB Ports. The communications interface panel shall include two USB 2.0 ports. If a communications interface panel fails to start and run due to a software or operating system failure, it shall be possible to reinstall all system and application software from a USB memory stick without necessitating removal of the communications interface panel from the cabinet.

643.0726 Power. The communications interface panel shall accept input voltage in the range of 89-265 VAC, 50/60 Hz power from the transient-protected side of the cabinet. The communications interface panel shall be protected by two slow blow fuses. Spares shall be attached to the panel.

643.073 Wired Input/Output Card. The video detection system shall support an optional wired input/output card that communicates with the communications interface panel for real-time detection states and other I/O to the traffic controller. The card may reside in a standard detector rack or shelf-mount enclosure with power module. The optional wired input/output card shall comply with the form factor and electrical characteristics to plug directly into a NEMA type C or D detector rack or Caltrans TEES Input File. The card shall occupy two slots of the detector rack and shall provide four detector outputs on its rear-edge connector. A front connector shall provide communication to the communications interface panel. A front connector shall allow 16 inputs and 24 contact-closure detector outputs for wiring into the cabinet. A front panel LED for each of the 16 inputs and 24 outputs shall indicate the state of the input or output. The wired input/output card shall support optional expansion cards in other slots. Each expansion card shall support 4 outputs to the back edge of the card. The wired input/output card shall support optional harnesses for connection to Input Files or C1, C4, C11, and C12 ports to support Type 170 or Type 2070 controllers.

643.074 System Management Software. Management software shall be a Windows-based application and shall be compatible with Windows 7 and Windows 10 operating systems. The software shall communicate with the video detection system via Ethernet. The management software shall automatically determine all video sensors and communications interface panels available on the local network and populate a list of all devices. The management software shall provide the user a means to name individual video sensors and communications interface panels.

The management software shall provide a means for the user to zoom the camera optics while viewing a live video stream. The management software shall provide a means for the user to calibrate distances in the field of view. The management software shall provide the user a means to create 4-sided detection zones in the field of view using either a still snapshot or live video. The management software will overlay an outline of each detection zone over the background image. It shall be possible for the user to place detection zones anywhere in the field of view for stop line

detection and/or advance detection. It shall be possible for the user to set the desired color of both the on and off states of the detection zone overlay. It shall be possible for the user to alter the size and shape of any previously created zone. It shall be possible for the user to overlap zones, either partially or fully. It shall be possible for the user to name each zone uniquely. It shall be possible for the user to assign each zone to detect vehicles, to detect bicycles, or to detect both, and to specify different outputs for each type. It shall be possible for the user to assign the same output to multiple zones such that the output will be on if any of the zones are detecting a vehicle or bicycle. It shall be possible for the user to assign a single zone to more than one output such that if a vehicle or bicycle is detected, all the assigned outputs shall be turned on. The management software shall be capable of creating at least 99 detection zones per video sensor.

It shall be possible for the management software to retrieve all configuration parameters from video sensors or communications interface panels. It shall be possible for the user to save all the settings for a video sensor or a communications interface panel to a laptop file. The management software shall provide a means to read or import all the settings from a previously saved configuration file for a video sensor or a communications interface panel. The management software shall be able to download a new version of the application software into a communications interface panel and its attached video sensors. The management software shall provide a screen to monitor operation of a video sensor. The monitoring screen shall include a live video stream from the video sensor with at least HD 1280x720 pixel resolution. The monitoring screen shall show indications of detection in real time by changing the color of the detection zone.

It shall be possible for the user to configure different indications for vehicle detections vs. bicycle detections when both are configured for the same zone. The monitoring screen shall include the following optional, configurable objects. It shall be possible for the user to size and position them anywhere on the screen and to change the color and size of text:

A. An indication of when an output is on or off, along with a user-configurable name for that indicator
B. The current time in the video sensor.
C. A user-configurable title or name.
D. The version number of the video sensor software.
E. It shall be possible for the user to turn the overlay graphics on or off with a single setting.

The management software shall provide a screen to monitor operation of the intersection with a quad-view video stream from the communications interface panel. The quad-view video stream shall have a resolution of at least HD 1280x720 pixels, where each of the sensor videos comprising the quad-view shall be at least 640x360 pixels. It shall be possible for the user to configure the order that the sensor videos appear in the quad-view. The real-time quad-view video stream shall be capable of displaying the overlay graphics for all four sensors simultaneously. While monitoring the video of a single video sensor or of the quad-view, it shall be possible for the user to request a “snapshot” or single-frame image to save to a named file on a laptop. While monitoring the video of a single video sensor or of the quad-view, it shall be possible for the user to record a period of the video to save to a named file on a laptop.

The video detection system and management software shall provide three methods to synchronize the time of day clocks in the communication interface panel and the video sensors, as follows:

A. Manual time synchronization operation by the user, which sets the time to the current time on the laptop where the management software is running.
B. A configuration setting to allow the communications interface panel to automatically obtain time from the NEMA TS2 protocol on the SDLC channel and broadcast it to the video sensors.
C. A configuration setting to allow the communications interface panel to automatically obtain time from up to five Network Time Protocol (NTP) sources and broadcast it to the video sensors.

In addition to the ability to view video streams in the management software, it shall be possible to view video from individual sensors or to view the quad-view from the communications interface panel using a third-party video player application on a tablet, smartphone or laptop computer.

643.075 Detection Performance. The video detection system shall detect the presence of vehicles in defined zones and turn on the assigned output when the vehicle is present in the zone.

For stop line detection zones, the probability of not detecting the presence of a vehicle shall be 1% or less under all operating conditions when the video sensor is installed and configured properly. For detection zones placed at the stop line, the probability of falsely detecting a vehicle that is not present shall be 3% or less under all operating conditions when the video sensor is installed and configured properly.

For advance detection zones it shall be possible to place the zones such that the farthest point of the zone is up to 600 feet from the video sensor. Advance detector zone placement shall include 2-3 car lengths of field-of-view beyond the farthest point of the zone. To ensure statistical significance for the above detection performance specifications, the data shall be collected over 24-hour time intervals (so as to avoid a single lighting condition) and will contain a minimum of one hundred (100) vehicles per lane. The calculations of detection performance will not include turning movements where vehicles do not pass through the detectors, vehicle lane-change anomalies, or where they stop short or stop beyond the combined detection zones.

643.076 Failsafe Mode. The video detection system shall provide a failsafe mode for each video sensor. If the failsafe mode is enabled, all programmed presence detection outputs for the video sensor shall be turned on, thus placing constant calls to the controller. When failsafe mode is disabled, all outputs revert to normal on/off operations. The video sensor shall continuously monitor the overall contrast in the video. If the overall contrast falls below a preset level (such as caused by dirty faceplate, severe glare, extreme fog, or temporary ice/snow on the faceplate), the sensor shall enable the failsafe mode. When sufficient contrast is restored in the video, the sensor will disable the failsafe mode.

The communications interface panel shall continuously monitor the connectivity status of the attached video sensors. If any video sensor goes offline due to either electrical failure or internal software failure, the communications interface panel shall enable the failsafe mode for that video sensor. If the video sensor comes back online, failsafe mode shall be disabled.

643.077 Data Collection. The video detection system shall automatically collect and store traffic flow data in non-volatile memory for later retrieval and analysis. No additional hardware or software shall be necessary. The data shall include vehicle counts and vehicle average speeds. The management software shall be able to retrieve collected data for a specified period of time or for all currently stored data and save into a standard CSV file.

643.078 Installation and Setup. The video detection system hardware shall be designed for flexible, fast and easy installation and setup. It shall be possible to mount the video sensor on an intersection pole, mast arm, or luminaire arm. No special tools or extra equipment, other than a laptop for configuration, will be required. Once all hardware is installed, connected and functional, it shall be possible to configure the video detection system for a typical 4-approach, 8-phase intersection in 15 minutes or less.

643.079 Warranty, Service and Support. The video detection system shall be provided with the following warranty, service and support options.

643.0791 Warranty. The manufacturer shall warrant the video detection system for a minimum of three (3) years. An option for up to six (6) years of warranty shall be available.

643.0792 Service. Ongoing software support by the manufacturer will include software updates of the video sensor, communications interface panel, and management software. These updates will be provided free of charge during the warranty period. The manufacturer will maintain a program for technical support and software updates following expiration of the warranty period. This program will be available to the contracting agency in the form of a separate agreement for continuing support.

643.0793 Support. A quick-start guide, installation guide, application notes, and other materials shall be available from the manufacturer to assist in product installation and setup for various applications. In addition, training online or in person shall be available. Training shall be available to personnel of the contracting agency in application design, operation, setup, and maintenance of the video detection system. Manufacturer shall provide a tech support website and an 800 number for technical support.

643.08 Contacts. All contacts used in connection with interval indications shall be of pure coin silver or equivalent, and shall be capable of breaking and carrying 15 A at 125 V alternating current. The contacts shall be readily accessible and capable of being replaced in the timer without the use of any tools other than pliers and screw driver.

643.09 Pedestals. Meter pedestal shall be as indicated on the plans.

643.10 Radio and television interference. Electrical equipment shall be prevented from interfering with radio and television reception.

643.11 Cable and Wire. Cable shall be plastic covered cable meeting the applicable requirements of the International Municipal Signal Association (IMSA) specifications. The conductor color coding shall not be by means of printed code. All wiring shall be new. Reuse of existing cable will not be allowed. Actual color coding shall be used. The minimum size wire for the circuits shall be as follows:

	Minimum A.W.G. #
(a) Service to Controller	4 Stranded
(b) Controller to Pole or Pedestal	12 Stranded

(c) Controller to Luminaire	8 Stranded
(c) Pole or Pedestal to Receptacles	14 Stranded
(d) Equipment Grounding Conductor	8 Stranded

Each lead-in cable shall be marked with plastic tape corresponding to the following color code to identify which phase it pertains to at the splice(s) in both the pull box(es) and in the cabinet.

PHASE COLOR CODE

Phase 1	1 Blue
Phase 2	1 Green
Phase 3	1 Yellow
Phase 4	1 Red
Phase 5	2 Blue
Phase 6	2 Green
Phase 7	2 Yellow
Phase 8	2 Red

Traffic signal conduit, pull boxes, frames, and covers shall conform to Section 626 of the Standard Specifications. Conduit for all lines shall be 3 inch in diameter unless noted on the plans. Unless otherwise noted, all conduits shall be schedule 80 PVC.

643.12 Painting. Prior to erection and assembly, if not manufactured of polycarbonate material, the entire traffic or pedestrian signal housing and visors shall be painted with an approved zinc-rich primer and a finish enamel coat of federal black No. 17038.

643.13 Backfill for foundations. Unless otherwise ordered, backfill for foundations shall be material conforming to the requirements of Section 203.26 of the Standard Specifications – Gravel Borrow.

643.14 Construction Requirements. All traffic signal and electrical installations shall comply with the requirements specified herein, local and utility codes, MUTCD, and the National Electrical Code (NEC). All employees of the signal subcontractor shall have an OSHA 10 Hour Certification. The signal subcontractor shall have at least one representative onsite at all times with an IMSA Traffic Signal Level 2 Field certification.

A preconstruction meeting with the Contractor, signal Subcontractor, Engineer and Maine Turnpike Authority representative shall be arranged not less than 3 days prior to the start of signal installation, to resolve any problems.

Any operating traffic signal shall be left in a non-flash operating condition at the end of each work day, with or without detection.

The signal Subcontractor shall notify the Maine Turnpike Authority ITS / Toll Manager no less than 3 days prior to final inspection of signal installation. This final inspection is required prior to signal activation.

Each signal head mounted on a mast arm shall be installed with a 1/8 inch diameter aircraft cable, looped around the mast arm and mast arm bracket, as a safety device to prevent the signal head from falling. Cable ends shall be fastened by two opposing "U" clamps. When suspended by this cable, the top of the signal head shall be no more than 6 inches below the bottom of the mast arm.

All conduit lines necessary shall be constructed for the proper operation of the signals and shall conform to Section 626 of the Standard Specifications.

All conduits terminating in the cabinet shall be sealed with duct sealant.

Concrete foundations with anchor bolts to secure the traffic signal structures, flasher or controller cabinets, and meter pedestals, shall be installed at the locations specified on the plans. The concrete foundation for the controller cabinet shall be raised a minimum height of 3 inches up to a maximum height of 18 inches above the finished surface as directed by the Resident. Chamfer strips shall be used on all signal controller cabinet foundations. Forms shall be inspected before concrete is placed.

Poles shall not be mounted on the leveling nuts until the concrete has cured for at least 7 days or attained a minimum of at least 80 percent of its design compressive strength.

Provide protection for wiring from rodents and other elements as approved by the Engineer and/or as shown on the Plans.

Prior to placing the controller cabinet on its foundation, silicone sealant shall be applied to the area of contact.

The Contractor shall use bolt pattern templates when setting mast-arm anchor bolts, signal pedestal bolts and controller cabinet mounting bolts. The templates shall remain in place for a minimum of 24 hours.

Wood poles shall be placed in the ground to a depth of 20% of their overall length, with a maximum deviation from the vertical of ¼ inch in 5 feet.

Wood poles with a back-guy cable shall be placed in the ground to a depth of 20% of their overall length. Poles shall be back-guyed using a 10-inch expanding anchor with a 3/4 inch by 96-inch anchor rod. Thimble eyes of anchor rods shall extend 12 inches above finish ground. Cable used for back-guying shall be attached to the anchor rod by a short bail automatic type grip and to the guy hook on the pole by a preformed type grip. The pole shall be drilled 14 inches from top and a 5/8 inch oval eyebolt installed with one square flat washer and square nut on the messenger side and one square washer, square nut and guy hook on the opposite side. Any guy wire, messenger wire or span wire installations done on Utility Company poles shall follow Utility Company requirements.

643.142 Service and Meter Box. Electrical Service for the signal will be provided by the MTA, the contractor shall run the needed conduit and wiring from the signal cabinet to the existing toll plaza utility building.

643.143 Signal Cable and Wire Installation. The Contractor shall furnish and install sufficient cable and wire to operate the system properly and at least 4 spare conductors in each cable run shall be provided. Pulling a separate cable to achieve the required number of spares will not be allowed.

Each mast arm assembly shall have a dedicated cable run from the controller cabinet.

No more than one cable shall be permitted in a conduit except to eliminate splices in pull boxes. When more than one cable is permitted the area of combined cables shall not exceed 30 percent of the inside area of the conduit.

Messenger cable shall run unspliced between poles and shall be installed with a *5* percent sag in the wire when measured from the point of attachment to the middle of span. The cable shall be attached to the pole eyebolt by a preformed type grip on one end and an automatic type grip on the opposite end. Messenger cable shall be grounded to the back-guy cable.

Signal bases, housings and controllers shall be furnished and installed as required. All structures and housings shall be plumb after erection.

Multiple housings on a single post shall be grouped together using 1-1/2 inch galvanized pipe and 1-1/2 inch galvanized rail fittings. All attachments to the posts shall be made by means of adapters conforming to the following. Housing adapters for pedestal mounting shall be constructed of cast iron. They shall be adjustable with serrated surfaces to permit the housing to be locked in the desired horizontal position. The adapters shall be secured to the bottom of the housing by means of a close nipple, shall slip fit at least 7 inch over a standard traffic signal post of 4 inches in diameter and shall be secured to the post by a minimum of four set screws. Adapters shall contain raceways from the housing to the post to protect the wires from the elements. The center of all housings shall be in the same horizontal plane.

Miscellaneous electrical equipment. All additional electrical fittings, service conduit, switches, fuses, traffic signal bulbs, and such other hardware as is necessary to properly and securely install the equipment shall be furnished. All electrical fittings shall be weatherproof. The existing luminaire on the northerly mast arm shall be fed from its own 15 amp breaker to be located in the cabinet.

Wiring and connections. All connections shall be spliced, soldered, compounded, and taped. The use of wire nuts will not be permitted. The following color code shall be used:

(a) Red Wire	Red, Artery
(b) Orange Wire	Yellow, Artery
(c) Green Wire	Green. Artery
(d) Red with tracer	Red, Side Street
(e) Orange with tracer	Yellow, Side Street
(f) Green with tracer	Green, Side Street
(g) White	Neutral for all signals

(h) Blue	All steady burning arrows
(i) Blue with tracer	Intermittent arrows
(j) Remaining	Push buttons and spares

Note: The white wire shall be used for all neutral connections and shall be connected to the service ground.

No street lighting splices will be permitted in the mast-arm shaft. Splices for street lighting and lightning arrestors shall be located inside the nearest street light pull box.

Ground connections. All installations and equipment shall be bonded and grounded to the service ground rod in accordance with the requirements of the electric power company.

Each signal cable run shall be installed with one green plastic covered copper ground wire to which all equipment shall be bonded in accordance with standard practice. Each base and post, cabinet, and any other component that would be considered a part of the signal system shall be bonded to the ground wire. This ground wire shall be connected to the ground rod at the controller cabinet.

643.1431 Painting. All paint shall conform to Section 708 of the Standard Specifications. The following colors of enamel shall be used:

(a) Controller Cabinet	Outside: Natural Aluminum
(b) Housings	Black (2)
(c) Visors	Inside: Black (2); Outside: Black (2)

	Federal No.
(1) Green Enamel =	H8-577
(2) Black Enamel =	17038
(3) Federal Yellow Enamel =	13538

After the signals have been completely installed, two coats of enamel shall be applied to all unpainted or scratched surfaces after the surface has been lightly sanded to remove gloss.

643.144 Installation of signals and equipment. The signals and equipment shall be installed by competent workmen or the manufacturer's representative.

Prior to placing the signals in operation, the signal housing shall be hooded with approved non-transparent material or turned to clearly indicate that the signals are not in operation.

Signs mounted on the signals not applicable to construction conditions shall be covered as specified in Section 645 of the Standard Specifications.

All material including poles, foundations, fittings and cable shall be supplied and installed to make a complete operative installation.

Signs installed on signal arms shall be mounted with "Astro Sign Bracs" at a right angle to the roadway. Signs mounted on span wire shall be mounted with Pelco "Span Wire Sign Hangar Assemblies," or equal.

643.145 Operation. The Contractor shall commence the operation of the signal system only when permitted by the Engineer. Unless otherwise noted, signals shall be placed in flash a minimum of 1 week before the planned start of operation. New signals shall be made operational between the hours of 10:00 AM and 2:00 PM unless approved by the Engineer.

Operating sequences shall be as shown on the plans or ordered.

Operating sequences shall be verified by testing.

In cooperation with the Fire Department, the Contractor shall make trial runs to ascertain proper timing of the fire pre-emption system. The minimum time shall be approved by the Chief of the Fire Department or the Chief's representative.

The Contractor shall provide a qualified technician to thoroughly review and confirm that the system is satisfactory and operational as designed. Prior to the final inspection, the Contractor shall have a review with the Authority's Toll / ITS Manager and local officials (including Fire Department technician) to review and comment upon the system.

643.146 Warranty. Upon completion of the project, the Contractor shall forward to the Authority all warranties to the purchaser that the equipment which has been installed hereunder shall be free from defects in materials, workmanship and title, and shall be of the kind and quality designated or described in the Contract. The foregoing warranty supersedes all other warranties whether written, oral, or implied. If it appears within 24 months from the date of Acceptance of the work that the equipment installed hereunder does not meet the warranties specified above, the Contractor shall promptly correct any defect or nonconformance with the specifications. This warranty does not relieve the Contractor of the requirement of Section 106 of the Standard Specifications.

643.15 Method of Measurement. The traffic signal modifications will be measured as a lump sum unit. The video detection system will be measured as a lump sum unit.

643.16 Basis of Payment. The accepted quantity of traffic signals will be paid for at the Contract lump sum price complete in place.

When an item of conduit appears in the Contract, conduit for traffic signals will be paid for under Section 626 of the Standard Specification. When no item for conduit appears in the Contract, any conduit required will be incidental.

All miscellaneous electrical equipment required shall be subsidiary.

Video detection system (Item 643.90) will be paid for at the contract lump sum price, which payment will be full compensation for installation and furnishing all materials and all appurtenances and incidentals required for a complete functioning installation. The Contractor shall coordinate with the Manufactures Representative for initial configuration and onsite training.

Payment will be made under:

Pay Item		Pay Unit
643.80	Traffic Signal Modifications: Exit 47 and Rand Road	Lump Sum
643.90	Video Detection System: Supply and Install	Lump Sum

SPECIAL PROVISION

SECTION 645

HIGHWAY SIGNING

(Relocate Existing Sign Assembly and Post)

645.07 Demounting and Reinstalling Existing Signs and Poles

The following paragraphs are added:

At locations noted on the Plans, existing ground-mounted signs are designated to be removed and relocated. This work shall consist of removing the sign panels, removing and relocating or disposing of the existing wood post and resetting the sign panels on a new wood post if required in the appropriate specified location. The Resident will determine if a new wood post is required.

Any existing signs not shown on the Plans are to remain in their existing condition unless directed otherwise by the Resident.

645.08 Method of Measurement

The following sentences are added:

Relocating existing sign assembly and post shall be measured as complete units each, removed, relocated and accepted.

645.09 Basis of Payment

The following paragraphs are added:

The accepted relocated signs will be paid for at the Contract unit price each as specified. Such price will include removing and relocating sign panels, removing and relocating or disposing existing wood post and resetting the sign panels on the existing or new wood post and new hardware as required to complete the sign installation. Any signs or supports damaged by the Contractor shall be replaced by him with new signs or supports conforming to the applicable Specifications at no additional cost to the Authority.

Payment will be made under:

Pay Item		Pay Unit
645.1061	Relocate Existing Sign Assembly and Post	Each

SPECIAL PROVISION

SECTION 652

MAINTENANCE OF TRAFFIC

(General)

Section 652 of the Maine Turnpike Authority 2016 Supplemental Specifications is modified as follows:

652.1 Description

The following sentence is added to the second paragraph:

652.3.5 Installation of Traffic Control Devices

This Subsection is amended by the addition of the following after the first paragraph.

All signs shall be mounted on easels except the following which shall be mounted on NCHRP 350 approved posts, unless behind guardrail.

- G20-1 ROAD WORK NEXT 6 MILES
- G20-2 END ROAD WORK
- G20-5aP WORK ZONE*
- R2-1 SPEED LIMIT 50*
- R2-6aP FINES DOUBLE*
- R2-12 END WORK ZONE SPEED LIMIT*
- R4-9P STAY IN LANE
- W8-11 UNEVEN LANES
- W8-15 GROOVED PAVEMENT
- W8-15P MOTORCYCLES (Graphic)
- W20-1 ROAD WORK AHEAD*
- CS-45 WIDE LOADS
- CS-48 WIDE LOADS
- LOGO S MAINE TURNPIKE
- W24-1aL LANE SHIFT PICTORIAL

* Where indicated on Plans

All traffic control signs shall be installed and removed daily with the exception of the above construction signs which shall be permanent until all work is complete or as approved by the Resident. During non-working hours, G20-5aP, R2-1 and R2-6aP signs shall be covered so they are not visible to drivers. When the paving operation in a location is completed, the W8-15, W8-15P and 4-9P construction signs shall be removed or covered.

G20-5aP, R2-1 & R2-6aP Construction Signs

There shall be a set of signs (a set consist of two each of G20-5aP, R2-1 and R2-6aP) installed off the edge of pavement on the inside and outside shoulders of both roadways. There shall be a set of signs at approximately every mile:

Beginning at:	Ending at:

4-9P & W8-11 Construction Signs

There shall be one set of signs (a set consist of two each of R4-9P & W8-11) for each area with uneven lanes. Each sign shall be mounted on easels on both sides of the roadway. The R4-9P signs shall be installed 2100 feet beyond the G20-5a, R2-1, and R2-6aP sign sets and the W8-11 signs shall be installed 500 feet beyond the R4-9P sign. These signs shall only be installed whenever there is the possibility of traffic traversing uneven lanes.

Drums shall not be placed in front of easel-mounted construction signs. Easel-mounted signs shall be placed adjacent to the drum line in the closed lane or shoulder, not off the edge of pavement.

652.3.6 Traffic Control

The following paragraph is added:

A Spotter shall be required at the front and rear of the paving operation on the mainline or as approved by the Resident and shall not be measured for payment. All spotters shall be equipped with handheld radios and spare batteries. The spotters will be required to move and maintain drums during the mobile paving operation.

The following Subsection is added:

652.62 Patrol Vehicle

The Contractor shall provide one traffic control vehicle(s) dedicated for traffic control only, with traffic coordinator(s) to be used for erecting, maintaining and dismantling lane closures as directed by the Resident. The traffic control vehicle(s) shall provide continuous patrolling (24-hours/seven days a week) when lane closures are installed (during non-work and work hours) to replace any and all damaged traffic control devices (arrow boards, variable message signs, barrels, signs, etc.). The traffic coordinator(s) shall report any and all disabled motorists, accidents or other unusual occurrences to the Resident, his representative or the Turnpike Authority's communication dispatcher throughout the duration of any and all lane closures.

The traffic control vehicle shall meet the following requirements:

a. In good mechanical condition, clean and presentable at all times.

b. Be equipped with a cellular phone capable of communicating with the Resident, his

representative or the Turnpike Authority's communication dispatcher.

c. Be equipped with a mounted revolving amber light or amber strobe light capable of 360-degree visibility to meet all lighting requirements.

d. Be equipped with a light bar (arrow board).

If the proper maintenance of traffic and proper provisions for traffic control are not being provided by the Contractor, the Authority reserves the right to assume maintenance of the traffic control and deduct the cost from any money due or to become due under the Contract. The Authority also reserves the right to suspend all work until the Contractor provides the proper maintenance of traffic and provisions for traffic control to the satisfaction of the Resident.

652.7 Method of Measurement

The second paragraph is deleted and replaced with the following:

Spotters will not be measured separately for payment except as noted, but shall be incidental to Item 652.361, Maintenance of Traffic Control Devices.

The following sentences are added:

The patrol vehicle(s), driver(s), assistant(s) and cellular phone(s) will not be measured separately for payment, but shall be incidental to Item 652.361.

The following is added to the end of the second paragraph:

The Authority will make payment for the State Police officers and vehicles directly to the State Police when utilized for mainline traffic control activities. State Police escorts, if required to move oversize material or equipment loads to the jobsite, will not be paid separately, but shall be incidental to the various pay items.

SPECIAL PROVISION

SECTION 652

MAINTENANCE OF TRAFFIC

(Specific Project Maintenance of Traffic Requirements)

This Specification describes the specific project maintenance of traffic requirements for this Project.

The following minimum traffic requirements shall be maintained. These requirements may be adjusted based on the traffic volume when authorized by the Authority.

The minimum width required for traffic during the following operations, are shown on the Traffic Control Plans.

- Milling and Paving Operations
- Drainage Installation and/or Adjustment
- Guardrail Improvements
- Rand Road Widening
- Pavement Markings Layout and Placement

All temporary lane closures shall be made utilizing drums.

Three cones or drums shall be placed transversely across the closed lane for every quarter mile of lane closure.

The Contractor will be allowed to store drums on the traffic side of the guardrail (face of guardrail) during non-work hours or when drums are not required for a lane closure. The drums shall be placed no more than six inches from the face of guardrail. If there is a Lane 2 closure the drums need to be stored on non-traffic side of the guardrail.

Temporary lane closures shall be removed if construction is not ongoing. Unattended lane closures are not allowed unless included in the contract language or approved by the Resident as a long term traffic control operation.

Portable light towers will be required to illuminate the night construction work area.

Interchange (south of toll plaza) Traffic Control Requirements

Interchange paving work includes, but is not necessarily limited to, pavement milling, pavement shimming, pavement surfacing, installation of pavement markings, guardrail repairs and height adjustments, delineator installations, and catch basin rebuilds.

Interchange work shall be completed Sunday through Thursday nights between 10:00 pm and 5:00 am at which times ramps are permitted to be closed. Work shall be scheduled and coordinated so ramps are not closed for limited activities, or for the convenience of the contractor. The contractor shall set, operate and maintain portable-changeable message signs on the mainline

(north of Exit 48 southbound; south of Exit 46 northbound) to provide advance notice to turnpike patrons and emergency services when Exit 47 ramp closures are scheduled or in place.

The Contractor will reimburse the Authority at the rate of $500 per 15-minute period for each ramp not reopened by the times specified above.

The contractor shall provide all lane closures, ramp closures and maintenance of traffic control devices required to facilitate the Exit 47 paving work. The Authority shall provide a trooper to monitor and control exiting/ entering traffic when Exit 47 ramp(s) are scheduled for closure

Interchange (north of toll plaza) Traffic Control Requirements

All lanes must remain open all days between the hours of 5:00 am and 10:00 pm. A minimum of one lane exiting and one lane entering must be maintained Sunday through Thursday during the hours of 10:00 pm and 5:00 am except for when both on ramps are closed or both off ramps are closed resulting in no traffic on the entering side or existing side of the plaza

Toll Approach Road Traffic Control Requirements

A minimum of two lanes consisting of 2 – 1’ shoulders and 2 – 11’ lanes on the existing side of the plaza shall be maintained at all times as shown on the Plans.

Rand Road Traffic Control Requirements

A minimum of two lanes consisting of 2 – 1’ shoulders and 2 – 11’ lanes shall be maintained at all times as shown on the Plans.

652.7 Method of Measurement

The following paragraph is added:

Traffic control devices required to complete the work will be measured for payment under their respective pay items. Installation, maintenance, and removal of traffic setups and the Contractor’s dedicated traffic employee’s will not be measured separately for payment, but shall be incidental to Item 652.361, Maintenance of Traffic Control Devices.

SPECIAL PROVISION

SECTION 652

MAINTENANCE OF TRAFFIC

(Flaggers)

The following section of the Supplemental Specification Section 652 have been revised as follows:

Section 652.2.4 Other Devices paragraph five is deleted and replaced with:

STOP/SLOW paddles shall be the primary and preferred hand-signaling device. Flags shall be limited to emergencies. The paddle shall have an octagonal shape and be at least 18 inches wide with letters at least 6 inches high and should be fabricated from light semi-rigid material. All STOP/SLOW Paddles

Section 652.4 Flaggers Last sentence in first paragraph is deleted and replaced with:

Only flashing SLOW/STOP paddles shall be used and the flagger station shall be illuminated to assure visibility in accordance with 652.6.2.

Add:

Flaggers shall not stop traffic on Turnpike mainline or interchange ramps. Only State Police are allowed to stop traffic on mainline or interchange ramps.

652.7 Method of Measurement Add

Flaggers shall only be measured for payment when utilized on Rand Road when the contractor is actively working along Rand Road. Flaggers used for the convenience of the Contractor, will not be measured for payment and shall be considered incidental to the various pay items.

SPECIAL PROVISION

SECTION 652

MAINTENANCE OF TRAFFIC

(Truck Mounted Attenuator)

Section 652 of the Maine Turnpike Authority 2016 Supplemental Specifications is modified as follows:

652.1 Description

The following paragraph is added:

When a pay item for a Truck Mounted Attenuator (TMA) is included in the contract at least one TMA will be required on the project and its use will be required. The truck mounted attenuator should be utilized in lane closures and other construction operations where workers are exposed to traffic and not protected by other positive means. The Contractor shall manage the utilization and operation of the TMA and if at least one is not used as described above then it will be considered a Traffic Control Plan violation and result in a reduction of payment as outlined in Section 652.

652.2.1 Truck Mounted Attenuator

This section is deleted in its entirety and replaced with the following:

The truck mounted attenuator system shall conform to the following requirements:

- Truck and attached attenuator shall conform to the NCHRP Report 350, Test Level 3 criteria.
- A mounted revolving amber light or amber strobe light with 360-degree visibility.
- An arrow light bar fixed to the vehicle.
- The attenuator shall be mounted to a vehicle with a minimum weight of 10,000 lbs.

652.3.7 Operations

This section is deleted in its entirety and replaced with the following:

The Contractor shall manage the operation of the truck mounted attenuator. The truck mounted attenuator should be utilized in lane closures and other construction operations where workers are exposed to traffic and not protected by positive means. The operation of the vehicle shall be in accordance with the Manual of Uniform Traffic Control Devices and the manufacturer's recommendation.

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 and if the work is mobile, then shadow truck distances shall

apply. The TMA shall not be located in the buffer zone. 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 lane. For placement details, reference the Manual of Uniform Traffic Control Devices (MUTCD).

Weight of Truck	Barrier Truck Distance from Work Zone of 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

652.7 Method of Measurement

The last paragraph is deleted and replaced with:

Truck mounted attenuator shall be measured for payment by the calendar day for each calendar day that a unit is used on a travel lane or shoulder on the project, as approved by the resident.

652.8.2 Basis of Payment

The last two paragraphs are deleted and replaced with:

The Truck Mounted Attenuator(s) will be paid for at the Contract unit price per calendar day for each TMA used. This price shall include all costs associated with the use of the vehicle. Payment shall include operator, fuel, truck, maintenance, flashing lights, arrow board and all other incidentals necessary to operate the vehicle.

Payment will be made under:

Pay Item		Pay Unit
652.45	Truck Mounted Attenuator	Calendar Day

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. When a pay item for an Automated Trailer Mounted Radar Speed Limit Sign is included in the Contract at least one will be required on the project when there is a Work Zone Speed Limit in place. 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, 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.

“Work Zone” construction signs shall be mounted on the trailer unit above the regulatory speed limit sign. (see Attached).

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.

CONSTRUCTION REQUIREMENTS

652.3.2 Responsibility of the Contractor

The Contractor shall furnish the Automated Trailer Mounted Speed Limit Sign as described in this Special Provision for this project.

All existing speed limit signs, which conflict with the construction zone trailer mounted speed limit signs shall be covered completely when the work zone speed limit is in place.

Automated Trailer Mounted Speed Limit Signs shall only be used when a work zone speed limit is in place. The Contractor shall manage the utilization and operation of the Automated Trailer Mounted Speed Limit Signs and if at least one is not used when work zone speed limits are in place then it will be considered a Traffic Control Plan violation and result in a reduction of payment as outlined in Section 652.

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.

The Automated Trailer Mounted Radar Speed Limit Sign may be placed as shown on the plans, or may replace the posted regulatory speed limit signs or may be placed at a location within the closed lane that has a reduced speed limit.

Automated Trailer Mounted Speed Limit 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 Authority, 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 Authority.

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.

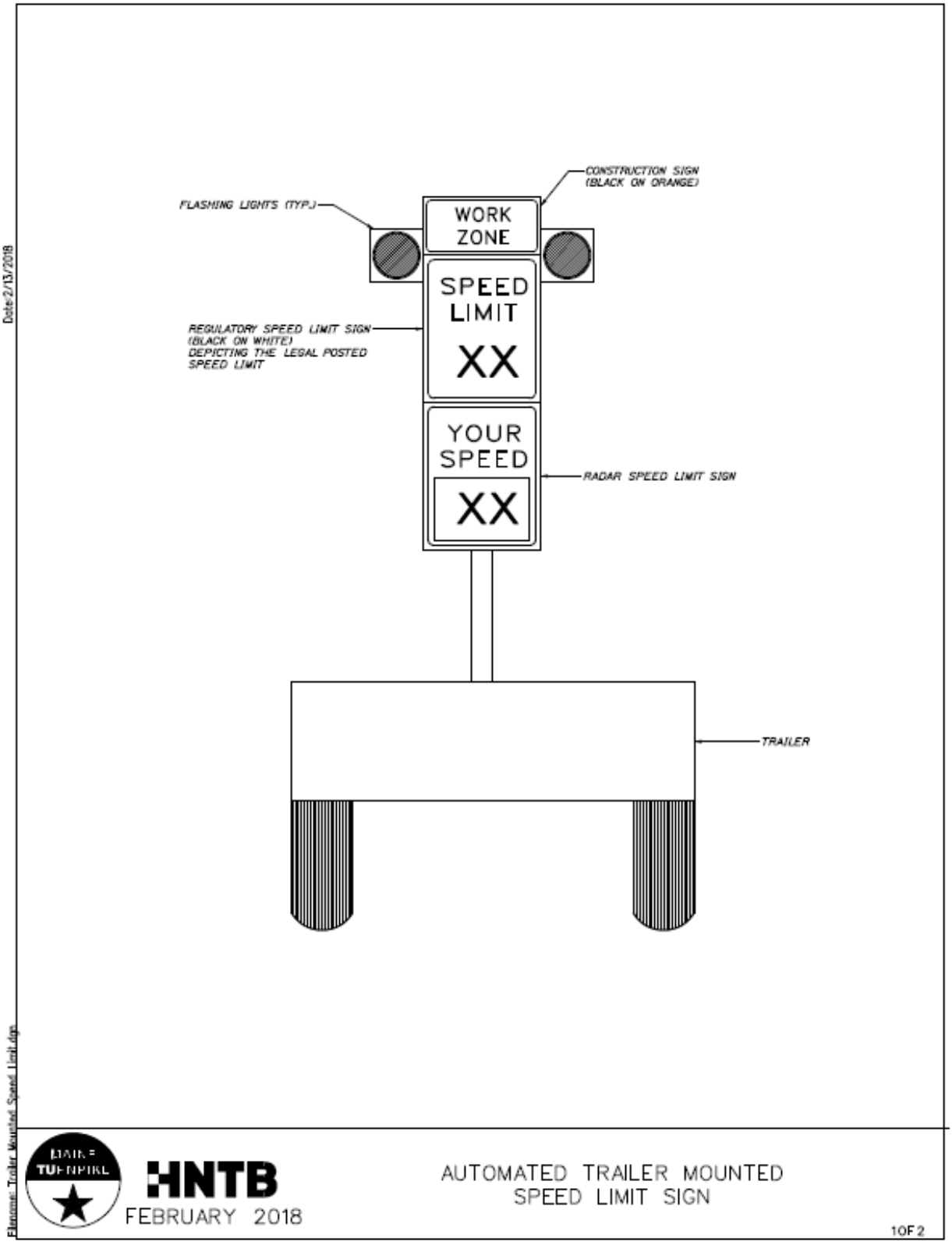
652.7 Method of Measurement

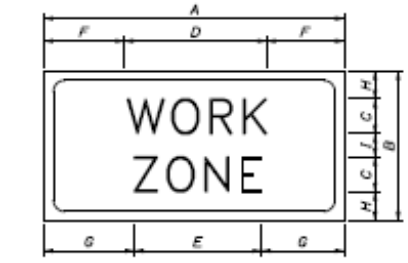
Automated Trailer Mounted Speed Limit Sign shall be measured for payment by the calendar day for each calendar day that the unit is used on a travel lane or shoulder on the project. Payment shall include the Trailer, Radar Speed Limit Sign, flashing beacon amber lights, regulatory speed limit sign, fuel, necessary maintenance, and all checking of Radar Speed Limit Signs by manufacturer and all project moves including the transporting and delivery of the unit.

652.8 Basis of Payment

The Automated Trailer Mounted Speed Limit Sign(s) will be paid for at the Contract unit price per calendar day. This price shall include all costs associated with the use of the Automated Trailer Mounted Speed Limit Sign.

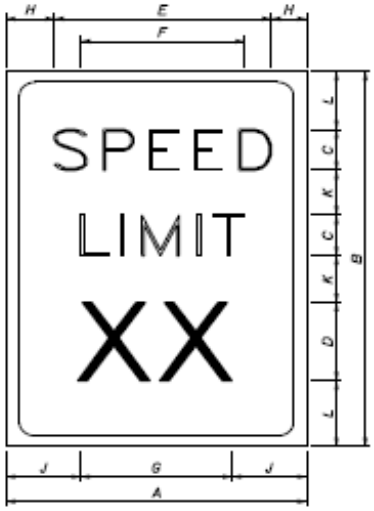
Pay Item		Pay Unit
652.451	Automated Trailer Mounted Speed Limit Sign	Calendar Day


CONSTRUCTION SIGN
(BLACK ON ORANGE)
FLASHING LIGHTS (TYP.)
WORK
ZONE
SPEED
LIMIT
XX
REGULATORY SPEED LIMIT SIGN
(BLACK ON WHITE)
DEPICTING THE LEGAL POSTED
SPEED LIMIT
YOUR
SPEED
XX
RADAR SPEED LIMIT SIGN
TRAILER
Date: 2/13/2018
Filename: Trailer Mounted Speed Limit.dgn
MAINE TURNPIKE
HNTB
FEBRUARY 2018
AUTOMATED TRAILER MOUNTED
SPEED LIMIT SIGN
1 OF 2



SIGN #1

1.25" BORDER, 0.75" INDENT,
BLACK ON ORANGE; BB GRADE PLYWOOD SIGN



SIGN #2

1.25" BORDER, 0.75" INDENT,
BLACK ON WHITE; BB GRADE PLYWOOD SIGN

	DIMENSIONS (INCHES) / LETTER FONTS											
	A	B	C	D	E	F	G	H	I	J	K	L
#1	48	20	5D	16⅛	16⅝	14⅞	15⅝	4	2	N/A	N/A	N/A
#2	48	60	8E	16E	38¼	29¼	29½	4⅛	9⅜	9¼	8	6

Date: 2/13/2018

Filename: Trailer Mounted Speed Limit.dgn

MAINE TURNPIKE

HNTB

FEBRUARY 2018

TRAILER MOUNTED CONSTRUCTION ZONE
SPEED LIMIT SIGN

2 OF 2

SPECIAL PROVISION

SECTION 652

MAINTENANCE OF TRAFFIC

(Temporary Portable Rumble Strips)

652.1 Description:

This work consists of furnishing and placing temporary portable rumble strips RoadQuake 2F TPRS or an approved equal.

652.2 Materials:

Furnish a temporary portable rumble strip system, which includes a method to transport and move these to on-site locations where they will be used. The Contractor shall submit for approval, literature and all necessary certifications to the Maine Turnpike prior to procurement of the product.

652.3 General:

If used, Temporary Portable Rumble Strips may not be practicable in areas where the roadway has more than two travel lanes, where volume windows do not allow for breaks in traffic to set up and monitor and adjust, or during night time lane closures.

Placement:

Provide rumble strips where the plans show or as directed by the Resident as follows:

Prior to placing rumble strips, clean the roadway of sand and other materials, that may cause slippage.

Place one end of the rumble strips 6 inches from the roadway centerline. Extend the strips perpendicular to the direction of travel. Ensure strips lay flat on the roadway surface.

Only one series of rumble strips, placed before the first work zone, is required per direction of travel for multiple work zones spaced 1 mile or less apart. Work zones spaced greater than 1 mile apart require a separate series of rumble strips. Each lane shall use one group of temporary rumble strips.

Bracketed “Rumble Strip Ahead” and “Bump” signs shall be utilized and will be paid for under the respective construction sign pay items.

Maintenance:

Maintain rumble strips as follows:

If rumble strips slide, become out of alignment, or are no longer in the wheel path of approaching vehicles during the work period, thoroughly clean both sides of the rumble strips and reset on a clean roadway.

Repair or replace damaged rumble strips immediately.

652.4 Method of Measurement:

The accepted quantity of temporary portable rumble strips shall be measured by the unit complete in place, per lane closure application. A unit shall consist of 1 group of 3 full-lane width of rumble strips. As shown in the plans, a maximum of 3 units may be used at each lane closure. A unit shall be measured for each group of rumble strips, each time they are used for a lane closure.

652.5 Basis of Payment:

The accepted quantity of temporary portable rumble strips will be paid for at the contract unit price per unit which shall include the transport device. Payment is full compensation for providing, relocating, maintaining or replacing, and removing temporary portable rumble strips.

If the pay item is not included in the contract quantities, then the Authority does not anticipate the use of this item on the contract. If contractor wishes to utilize temporary portable rumble strips and the item is not in the contract, then the contractor may propose use of them to the Authority for consideration.

Pay Item		Pay Unit
652.46	Temporary Portable Rumble Strip	Unit

SPECIAL PROVISION

SECTION 655

ELECTRICAL WORK

(Fiber Optic Cable)

The following Section is added:

655.01 Description

This task shall include the providing and installation of 62.5/125 micron multimode fiber optic cable as shown on the Plan drawings and described herein. The following specifications for the selection and installation of fiber-optic cable and associated hardware are intended to ensure a reliable and consistent fiber optic media infrastructure for the MTA. All fiber optic cable termination will be incidental to the fiber optic cable.

655.02 Materials

Cable: 6-Fiber multi-mode, 100 mbs, 62.5/125 Microns, Indoor/Outdoor Riser Rater, ST (Male) Connection, as approved.

Specifications: Fiber installed must meet or exceed the following specifications:

- Multimode fiber installed cable shall be 62.5/125micron core/cladding, enhanced grade, multimode, and graded index glass fiber. All materials in the cable shall be dielectric.

- Installed fiber must meet or exceed the following performance specifications:

Wavelength (nm)	Max. Attn.(dB/Km)	Min. Bandwidth (Mhz*Km)
850	3.0	200
1,300	0.9	500

- Plenum rated cable shall be used for all interior installations. Plenum rated cable shall be:
  - Tight buffered 900 um
  - Mechanical strippable Teflon (for plenum applications)
  - EIA/TIA -598 color coding for fiber optic cable
  - Aramid yarn strength member
  - Capable of supporting a short-term tensile load of 400 lb. without stretching.
  - Capable of bend radii as small as 20 x outside cable diameter (under installation load) and 10 x outside cable diameter (long term load)
  - Capable of a minimum crush resistance of 850 lb./in.

- Corning fiber is currently required for installation. Cable from other manufacturers will not be considered.

All cable is to be fully supported throughout its entire run.

At no time shall more than 400 pounds of tension be placed on any fiber cable while it is being pulled through tray or conduit. It is preferred that all fiber cable be pulled with hand power only. If power winches or mechanical advantage devices are used to pull cable, a tensionometer must be used to insure that maximum tension is not exceeded. Alternatively, a "mechanical fuse" rated at 350 pounds may be included in the linkage. Torsion shall be avoided by the use of a swivel at the cable end. While under tension, a minimum bend radius of 20 times the outside cable diameter will be maintained through the use of pulleys and sheaves where required. After pulling, no bend may have a radius, at rest, of less than 10 times the outside cable diameter.

Each cable is to be permanently labeled at each end with a unique cable number. In addition, labels shall be affixed to the cable at every transition of a vault, hand hole, riser closet, or major pull box.

Each fiber optic strand shall be labeled with a unique identifier at the ST coupler.

Fiber ends are to be terminated in ST-type connectors. No splices will be permitted. The cable shall be continuous run from lane controller to server room fiber switch location.

At each end of the cable, sufficient slack (15 - 30') shall be left to facilitate reasonable future relocation of the fiber switch or lane controller. Slack shall be mounted on walls or upper ladder racks.

Testing: Contractor shall test all long reels with an OTDR for length and transmission anomalies while on the reel prior to installation. It is suggested that each individual fiber in a cable regardless of length be tested with an OTDR for length and transmission anomalies while on the reel before installation.

All multimode fiber strands shall be tested end-to-end for bi-directional attenuation, 850 nm/1300 nm for multimode. Tests should be conducted in compliance with EIA/TIA-526-14 or OFSTP 14, Method B, according to the manufacturer’s instructions for the test set being utilized.

Tests must ensure that the measured link loss for each strand does not exceed the “worst case” allowable loss defined as the sum of the connector loss (based on the number of mated connector pairs at the EIA/TIA-568 B maximum allowable loss of 0.75 dB per mated pair) and the optical loss (based on the performance standard above, 2.1.1 and 2.2.1).

After termination, each fiber shall be tested with an ODTR for length, transmission anomalies, and end-to-end attenuation. Results are to be recorded and supplied to MTA in the form of hard-copy printouts or photographs of screen traces.

After termination each terminated fiber is to be tested for end-to-end loss with a power meter/light source. As above, results are to be recorded and supplied to MTA.

5.2.4. The Contractor shall review all end faces of field terminated connectors with a fiber inspection scope following the final polish. Connector end faces with hackles, scratches, cracks, chips and or surface pitting shall be rejected and re-polished or replaced if re-polishing will not remove the end face surface defects. The recommended minimum viewing magnifications for connector ends are 100X for multimode fiber and 200X for single mode fiber.

655.05 Measurement of Payment

Measurement for the installation of the Fiber Optic cable will be by linear foot to the nearest 10 ft. interval. It shall include the furnishing, installation, routing and termination of the cable per the plan drawings.

655.06 Basis of Payment

The accepted quantity of 6 Strand Multi-modal Fiber Optic Cable will be paid for at the Contract unit price per linear foot for furnishing, installation, routing, and termination of the cable.

Payment will be made under:

Pay Item		Pay Unit
655.16	Fiber Optic Cable	Linear Foot

SPECIAL PROVISION

SECTION 655

ELECTRICAL WORK

(Fiber Optic Splice Panel)

The following Section is added:

655.01 Description

This task shall include providing and installing fiber optic splice panels as described herein. Fiber optic splice panels shall be Panduit® FWME2 or an approved equal.

655.05 Measurement of Payment

Measurement for installing the fiber optic splice panel cabinet as shown on the Plans and as described herein will be per each item. It shall include the furnishing, installation, and mounting of the cabinet.

655.06 Basis of Payment

The accepted quantity of Fiber Optic Splice Panels will be paid for at the Contract unit price per each for furnishing, installation and routing of the cable.

Payment will be made under:

Pay Item		Pay Unit
655.165	Fiber Optic Splice Panel	Each

SPECIAL PROVISION

SECTION 719

SIGNING MATERIAL

Section 719.01 Reflective Sheeting

This Subsection is deleted in its entirety and replaced with the following:

Retroreflective sheeting for signs shall meet at a minimum the requirements for, ASTM 4956 – Type VII, Type VIII or Type IX, for all signs. All Type 1 Guide Signs shall meet at a minimum the requirements for ASTM 4956 –Type XI sheeting. Use of overlay film that degrades the retroreflectivity of the sign sheeting (i.e. Avery-Dennison overlay film) will be prohibited.

Reflective sheeting, used in sign construction, shall have been manufactured within the six months immediately prior to the fabrication of each sign. Upon delivery at the job site of each shipment of signs, a letter of certification shall be provided that the reflective sheeting conforms to the requirements.

Signs may only be covered using materials and techniques explicitly approved by the sheeting manufacturer for that purpose and shall not alter the sign sheeting warranty.

- For Type 1 Guide Signs, all reflective sheeting shall be color matched on each sign unit.
- All warning signs shall be fluorescent yellow except for Ramp Advisory Speed signs which shall be yellow.
- All Construction Series signs that use orange backgrounds shall be fluorescent orange.
- All Pedestrian Signs shall be fluorescent yellow-green.
- EZ-PASS Purple shall conform to the FHWA Purple color block.

719.02 Demountable High Intensity Reflectorized Letters, Numerals, Symbols, and Borders

This Subsection, including the title, is deleted in its entirety and replaced with the following:

719.02 Direct Applied Reflectorized Letters, Numerals, Symbols, and Borders

Direct applied letters, numerals, symbols and borders shall consist of cut out sheeting shall meet at a minimum the requirements for ASTM 4956 – Type VII, Type VIII or Type IX sheeting.

All Type 1 Guide Signs shall meet at a minimum the requirements for ASTM 4956 –Type XI sheeting.