Updated 05/15/2020

FEDERAL PROJECT

Effective May 15, 2020
Supersedes April 22, 2020

BIDDING INSTRUCTIONS

FOR ALL PROJECTS:

1. Use pen and ink to complete all paper Bids.
2. As a minimum, the following must be received prior to the time of Bid opening:

For a Paper Bid:

a) a copy of the Notice to Contractors, b) the completed Acknowledgement of Bid Amendments form, c) the completed Schedule of Items, d) two copies of the completed and signed Contract Offer, Agreement & Award form, e) a Bid Guaranty, (if required), and f) any other certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

For an Electronic Bid:

NOTE: Not all projects accept Electronic Bids. Please review the Notice to Contractors and see if it specifically states that Electronic Bids will be accepted.

a) a completed Bid using Expedite® software and submitted via the Bid Express™ web-based service, b) an electronic Bid Guaranty (if required) or a faxed copy of a Bid Bond (with original to be delivered within 72 hours), and c) any other Certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

3. Include prices for all items in the Schedule of Items (excluding non-selected alternates).
4. Bid Guaranty acceptable forms are:
   a) a properly completed and signed Bid Bond on the Department's prescribed form (or on a form that does not contain any significant variations from the Department's form as determined by the Department) for 5% of the Bid Amount or
   b) an Official Bank Check, Cashier's Check, Certified Check, U.S. Postal Money Order or Negotiable Certificate of Deposit in the amount stated in the Notice to Contractors or
   c) an electronic bid bond submitted with an electronic bid.

5. If a paper Bid is to be sent, "FedEx First Overnight" delivery is suggested as the package is delivered directly to the DOT Headquarters Building located at 16 Child Street in Augusta. Other means, such as U.S. Postal Service's Express Mail has proven not to be reliable.

IN ADDITION, FOR FEDERAL AID PROJECTS:

6. Complete the DBE Proposed Utilization form, and submit with your bid. If you are submitting your bid electronically, you must FAX the form to (207) 624-3431. This is a curable defect.

If you need further information regarding Bid preparation, call the DOT Contracts Section at (207) 624-3410.

For complete bidding requirements, refer to Section 102 of the Maine Department of Transportation, Standard Specifications, March 2020 Edition.

April 28, 2017
Supersedes November 05, 2014

NOTICE

The Maine Department of Transportation is attempting to improve the way Bid Amendments/Addendums are handled and allow for an electronic downloading of bid packages from our website, while continuing to maintain an optional plan holders list.

Prospective bidders, subcontractors or suppliers who wish to download a copy of the bid package and receive a courtesy notification of project specific bid amendments must fill out the on-line plan holder registration form and provide an email address to the MDOT Contracts mailbox at: MDOT.contracts@maine.gov. Each bid package will require a separate request.

Additionally, interested parties will be responsible for reviewing and retrieving the Bid Amendments from our web site, and acknowledging receipt and incorporating those Bid Amendments in their bids using the Acknowledgement of Bid Amendment Form.

The downloading of bid packages from the MDOT website is not the same as providing an electronic bid to the Department. Electronic bids must be submitted via http://www.BIDX.com. For information on electronic bidding contact Rebecca Snowden at rebecca.snowden@maine.gov or Diane Barnes at diane.barnes@maine.gov.

NOTICE

For security and other reasons, all Bid Packages which are mailed, shall be provided in double (one envelope inside the other) envelopes. The *Inner Envelope* shall have the following information provided on it:

Bid Enclosed - Do Not Open
PIN:
Town:
Date of Bid Opening:
Name of Contractor with mailing address and telephone number:

In Addition to the usual address information, the *Outer Envelope* should have written or typed on it:

Double Envelope: Bid Enclosed
PIN:
Town:
Date of Bid Opening:
Name of Contractor:
This should not be much of a change for those of you who use Federal Express or similar services.

Hand-carried Bids may be in one envelope as before, and should be marked with the following information:

Bid Enclosed: Do Not Open
PIN:
Town:
Name of Contractor:

October 16, 2001

STATE OF MAINE DEPARTMENT OF TRANSPORTATION

Bid Guaranty-Bid Bond Form

KNOW ALL MEN BY THESE PRESENTS THAT_____

_____, of the City/Town of_____and State of_____

as Principal, and_____as Surety, a

Corporation duly organized under the laws of the State of_____and having a usual place of

Business in_____and hereby held and firmly bound unto the Treasurer of

the State of Maine in the sum of_____,for payment which Principal and Surety bind

themselves, their heirs, executers, administrators, successors and assigns, jointly and severally.

The condition of this obligation is that the Principal has submitted to the Maine Department of Transportation, hereafter Department, a certain bid, attached hereto and incorporated as a part herein, to enter into a written contract for the construction of _____

_____

_____and if the Department shall accept said bid and the Principal shall execute and deliver a contract in the form attached hereto (properly completed in accordance with said bid) and shall furnish bonds for this faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be null and void; otherwise it shall remain in full force, and effect.

Signed and sealed this_____day of_____20_____

WITNESS:

_____

_____

_____

PRINCIPAL:

By_____

By:_____

By:_____

WITNESS

_____

_____

_____

SURETY:

By_____

By:_____

Name of Local Agency: _____

SAMPLE

NOTICE

Bidders:

Please use the attached "Request for Information" form when submitting questions concerning specific Contracts that have been advertised for Bid, include additional numbered pages as required. RFI's may be faxed to 207-624-3431, submitted electronically through the Departments web page of advertised projects by selecting the RFI tab on the project details page or via e-mail to RFI-Contracts.MDOT@maine.gov.

These are the only allowable mechanisms for answering Project specific questions. Maine DOT will not be bound to any answers to Project specific questions received during the Bidding phase through other processes.

When submitting RFIs by Email please follow the same guidelines as stated on the "Request for Information" form and include the word "RFI" along with the Project name and Identification number in the subject line.

State of Maine
Department of Transportation

RFI No: _____

REQUEST FOR INFORMATION

Date _____ Time _____

Information Requested for:

WIN(S): _____ Town(s):_____Bid Date: _____

Question(s):_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Request by:

Company Name:_____**Phone:(_____)**_____

Email:_____**Fax: (_____)**_____

Complete this form and fax to 207-624-3431, Attn: Project Manager (name listed on the "Notice to Contractors"), or Email questions to RFI-Contracts.MDOT@maine.gov. Please include the word "RFI" along with the Project Name and Identification Number in the Subject line, or electronically by using the RFI Tab located on the Individual Projects Detail page.

NOTICE

Disadvantaged Business Enterprise Proposed Utilization

The Apparent Low Bidder shall submit the Disadvantaged Business Enterprise Proposed Utilization form with their bid. This is a curable bid defect.

The Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan form contains additional information that is required by USDOT.

The Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan form should be used.

A copy of the new Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan and instructions for completing it are attached.

Note: Questions about DBE firms, or to obtain a printed copy of the DBE Directory, contact The Office of Civil Rights at (207) 624-3066.

MDOTs DBE Directory of Certified firms can also be obtained at https://www.maine.gov/mdot/civilrights/dbe/

INSTRUCTIONS FOR PREPARING THE MaineDOT CONTRACTOR'S DBE/SUBCONTRACTOR UTILIZATION FORM

The Contractor Shall Extend equal opportunity to MaineDOT certified DBE firms (as listed in MaineDOT's DBE Directory of Certified Businesses) in the selection and utilization of Subcontractors and Suppliers.

SPECIFIC INSTRUCTIONS FOR COMPLETING THE FORM:

Insert Contractor name, the name of the person(s) preparing the form, and that person(s) telephone, fax number and e-mail address.

Calculate and provide percentage of your bid that will be allocated to DBE firms, Federal Project Identification Number, and location of the Project work.

In the columns, name each subcontractor, DBE and non-DBE firm to be used, provide the Unit/Item cost of the work/product to be provided by the subcontractor, give a brief description and the dollar value of the work.

Revised 1/12

DBE GOAL NOTICE FFY 2019-2021
Maine Department of Transportation
Disadvantaged Business Enterprise Program

Notice is hereby given that in accordance with US DOT regulation 49 CFR Part 26, the Maine Department of Transportation (MaineDOT) has established a Disadvantaged Business Enterprise Program (DBE) for disadvantaged business participation in the federal-aid highway and bridge construction programs; MaineDOT contracts covered by the program include consulting, construction, supplies, manufacturing, and service contracts.

For FFY 2019-21 (October 1, 2018 through September 30, 2021) MaineDOT has established an annual DBE participation goal of **2.4%** to be achieved through race/gender neutral means. This goal has been approved by the Federal Highway Administration and remains in effect through September 30, 2021. Maine DOT must meet this goal each federal fiscal year. If the goal is not met, MaineDOT must provide a justification for not meeting the goal and provide a plan to ensure the goal is met, which may include placing contract goals on certain projects that contractors will be required to meet.

MaineDOT asks all contractors, consultants and subcontractors to seek certified DBE firms for projects and to work to meet the determined 2.4% goal without the need to impose contract goals. DBE firms are listed on the MaineDOT website at:

https://www.maine.gov/mdot/civilrights/docs/dbe/WeeklyDBEVendorList.pdf

Interested parties may view MaineDOT's DBE goal setting methodology, also posted on this website. If you have questions regarding this goal or the DBE program you may contact Sherry Tompkins at the Maine Department of Transportation, Civil Rights Office by telephone at (207) 624-3066 or by e-mail at: sherry.tompkins@maine.gov

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MaineDOT CONTRACTOR'S DBE/SUBCONTRACTOR PROPOSED UTILIZATION FORM

All Bidders must furnish this form with their bid on Bid Opening day

Contractor: _____ **Telephone:** _____ **Ext** _____

Contact Person: _____ **Fax:** _____

E-mail: _____

BID DATE: _____

FEDERAL PROJECT PIN # _____ **PROJECT LOCATION:** _____

TOTAL ANTICIPATED DBE____% PARTICIPATION FOR THIS CONTRACT

WBE	DBE	Non DBE	Firm Name	Item Number & Description of Work	Quantity	Cost Per Unit/Item	Anticipated $ Value
						Subcontractor Total>	
						DBE Total >	

NOTE: THIS INFORMATION IS USED TO TRACK AND REPORT ANTICIPATED DBE PARTICIPATION IN ALL FEDERALLY FUNDED MAINE DOT CONTRACTS. THE ANTICIPATED DBE AMOUNT IS VOLUNTARY AND WILL NOT BECOME A PART OF THE CONTRACTUAL TERMS.

Equal Opportunity Use:

Form received:____/___/___Verified by: _____

FHWA ☐ FTA ☐ FAA ☐

For a complete list of certified firms and company designation (WBE/DBE) go to http://www.maine.gov/mdot/civilrights/

Rev. 01/15

Maine Department of Transportation Civil Rights Office

Directory of Certified Disadvantaged Business Enterprises

Listing can be found at:

https://www.maine.gov/mdot/civilrights/dbe/

For additional information and guidance contact:

Civil Rights Office at (207) 624-3066

It is the responsibility of the Contractor to access the DBE Directory at this site in order to have the most current listing.

Vendor Registration

Prospective Bidders must register as a vendor with the Department of Administrative & Financial Services if the vendor is awarded a contract. Vendors will not be able to receive payment without first being registered. Vendors/Contractors will find information and register through the following link –
http://www.maine.gov/purchases/venbid/index.shtml

STATE OF MAINE DEPARTMENT OF TRANSPORTATION
NOTICE TO CONTRACTORS

Sealed Bids addressed to the Maine Department of Transportation, Augusta, Maine 04333 and endorsed on the wrapper "Bids for **New Connector Construction** in the city/town of **Brewer - Eddington** " will be received from contractors at the Reception Desk, MaineDOT Building, Capitol Street, Augusta, Maine, until 11:00 o'clock A.M. (prevailing time) on **November 10, 2021** and at that time and place, publicly opened and read. Bids will be accepted from all bidders. The lowest responsive bidder must have completed, or successfully complete, a **Highway Construction prequalification),** or project specific prequalification to be considered for the award of this contract. **We now accept electronic bids for bid packages posted on the bidx.com website. Electronic bids do not have to be accompanied by paper bids. Please note: The Department will accept a facsimile of the bid bond; however, the original bid bond must then be received at the MDOT Contract Section within 72 hours of the bid opening. Until further notice, dual bids (one paper, one electronic) will be accepted, with the paper copy taking precedence.**

Description: Maine Federal Aid Project No. 1891500 WIN. 018915.00

Location: In Penobscot County, project is located 0.47 mi. west of I-395 and Rte.1A. Extending 6.05 miles roughly parallel to the Brewer – Holden town line, to Rte.9. Approx. 0.90 mi. west of Chemo Pond Rd.

Outline of Work: New Connector Construction and other incidental work.

For general information regarding Bidding and Contracting procedures, contact George Macdougall at (207) 624-3410. Our webpage at http://www.maine.gov/mdot/contractors/ contains a copy of the Schedule of Items, Plan Holders List, written portions of bid amendments, drawings, bid results and an electronic form for RFI submittal. For Project-specific information fax all questions to **Project Manager** Rhobe Moulton at (207) 624-3431, use electronic RFI form or email questions to RFI-Contracts.MDOT@maine.gov, project name and identification number should be in the subject line. Questions received after 12:00 noon of Monday (or if that Monday is a state holiday, Friday) prior to bid date will not be answered. Bidders shall not contact any other Departmental staff for clarification of Contract provisions, and the Department will not be responsible for any interpretations so obtained. TTY users call Maine Relay 711.

Plans, specifications and bid forms may be seen at the MaineDOT Building in Augusta, Maine, and at the Department of Transportation's Regional Office in Bangor. They may be purchased from the Department between the hours of 8:00 a.m. to 4:30 p.m. by cash, credit card (Visa/Mastercard) or check payable to Treasurer, State of Maine sent to Maine Department of Transportation, Attn.: Mailroom, 16 State House Station, Augusta, Maine 04333-0016. They also may be purchased by telephone at (207) 624-3536 between the hours of 8:00 a.m. to 4:30 p.m. Full size plans **$862.00 ($877.00** by mail). Half size plans **$431.00 ($437.00** by mail), Bid Book $10 ($13 by mail), Single Sheets $2, payment in advance, all non-refundable.

Each Bid must be made upon blank forms provided by the Department and must be accompanied by a bid bond at 5% of the bid amount or an official bank check, cashier's check, certified check, certificate of deposit, or United States postal money order in the amount of 5% of the bid amount, payable to Treasurer, State of Maine as a Bid guarantee. A Contract Performance Surety Bond and a Contract Payment Surety Bond, each in the amount of 100 percent of the Contract price, will be required of the successful Bidder.

This Contract is subject to all applicable Federal Laws. This contract is subject to compliance with the Disadvantaged Business Enterprise program requirements as set forth by the Maine Department of Transportation.

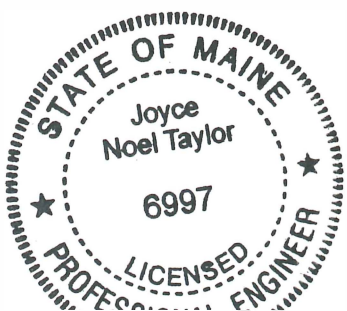
All work shall be governed *by State of Maine, Department of Transportation, Standard Specifications, March 2020 Edition,* price $10 [$15 by mail], and *Standard Details, March 2020 Edition*, price $10 [$15 by mail]. They also may be purchased by telephone at (207) 624-3536 between the hours of 8:00 a.m. to 4:30 p.m. *Standard Detail* updates can be found at http://www.maine.gov/mdot/contractors/publications/ .

The right is hereby reserved to the MaineDOT to reject any or all bids.

Augusta, Maine
October 6, 2021

Joyce Noel Taylor

JOYCE NOEL TAYLOR P. E.
CHIEF ENGINEER



NOTICE

All bids for Federal Projects **shall** be accompanied by the DBE Proposed Utilization form. If you are submitting an electronic bid, the DBE Utilization Form may be faxed to 207-624-3431. Failure to submit the form with the bid will be considered a curable defect.

March 26, 2020

NOTICE

(COVID-19 Pandemic)

The Department considers the COVID-19 Pandemic an Uncontrollable Event as defined in Section 101.2 of the Department's Standard Specifications.

Accordingly, any documented delay to the project's Critical Path due to COVID-19 related issues, such as impacted workforce, subcontracts, or material supply, will be considered an Excusable Delay as defined in Section 109.5(A)(3) of the Department's Supplemental Specifications.

As an Excusable Delay, the Contractor is entitled to an extension of time provided that other associated notification, documentation, and procedural requirements set forth in the Contract are met.

SPECIAL PROVISION 102.7.3
ACKNOWLEDGMENT OF BID AMENDMENTS

With this form, the Bidder acknowledges its responsibility to check for all Amendments to the Bid Package. For each Project under Advertisement, Amendments are located at http://www.maine.gov/mdot/contractors/ . It is the responsibility of the Bidder to determine if there are Amendments to the Project, to download them, to incorporate them into their Bid Package, and to reference the Amendment number and the date on the form below. The Maine DOT will not post Bid Amendments any later than noon the day before Bid opening without individually notifying all the planholders.

Amendment Number	Date

The Contractor, for itself, its successors and assigns, hereby acknowledges that it has received all of the above referenced Amendments to the Bid Package.

CONTRACTOR

_____ _____
Date Signature of authorized representative

_____
(Name and Title Printed)

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0010	201.11 CLEARING	63.000 AC				
0020	201.23 REMOVING SINGLE TREE TOP ONLY	40.000 EA				
0030	201.24 REMOVING STUMP	40.000 EA				
0040	202.01 REMOVING STRUCTURES AND OBSTRUCTIONS	LUMP SUM	LUMP SUM			
0050	202.08 REMOVING BUILDING NO.: 1: STA. 178+00 LT	LUMP SUM	LUMP SUM			
0060	202.08 REMOVING BUILDING NO.: 2: STA. 197+00 RT	LUMP SUM	LUMP SUM			
0070	202.08 REMOVING BUILDING NO.: 3: STA. 197+00 RT	LUMP SUM	LUMP SUM			
0080	202.08 REMOVING BUILDING NO.: 4: STA. 211+80 LT	LUMP SUM	LUMP SUM			
0090	202.08 REMOVING BUILDING NO.: 5: STA. 225+00	LUMP SUM	LUMP SUM			
0100	202.08 REMOVING BUILDING NO.: 6: STA. 241+00 RT	LUMP SUM	LUMP SUM			
0110	202.08 REMOVING BUILDING NO.: 7: Sta. 304+00 Rt.	LUMP SUM	LUMP SUM			

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0120	202.202 REMOVING PAVEMENT SURFACE	1,660.000 SY	_____.____	_____.____
0130	202.31 PROFILE MILLING CONCRETE WEARING SURFACE	780.000 SY	_____.____	_____.____
0140	203.20 COMMON EXCAVATION	662,900.000 CY	_____.____	_____.____
0150	203.21 ROCK EXCAVATION	66,300.000 CY	_____.____	_____.____
0160	203.211 PRESPLITTING ROCK	9,200.000 LF	_____.____	_____.____
0170	203.213 DRILLING AND BLASTING OF SOLID ROCK SUBGRADE	11,300.000 SY	_____.____	_____.____
0180	203.25 GRANULAR BORROW	7,560.000 CY	_____.____	_____.____
0190	203.33 SPECIAL FILL	331.000 CY	_____.____	_____.____
0200	203.4338 LIGHTWEIGHT FILL FOAMED GLASS AGGREGATE	77,000.000 CY	_____.____	_____.____
0210	203.55 CULVERT BEDDING STONE	1,380.000 CY	_____.____	_____.____
0220	206.082 STRUCTURAL EARTH EXCAVATION - MAJOR STRUCTURES	3,840.000 CY	_____.____	_____.____
0230	209.29 VERTICAL DRAINAGE WICKS	826,000.000 LF	_____.____	_____.____

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0240	211.45 SAND BLANKET	89,000.000 CY				
0250	304.10 AGGREGATE SUBBASE COURSE - GRAVEL Highway & Bridge Combined	168,350.000 CY				
0260	401.10 HOT MIX ASPHALT CONTINUOUS THERMAL PROFILING	LUMP SUM	LUMP SUM			
0270	403.2072 19 MM ASPHALT RICH BASE MIXTURE	16,300.000 T				
0280	403.2081 12.5 MM POLYMER MODIFIED HOT MIX ASPHALT	19,000.000 T				
0290	403.209 HOT MIX ASPHALT 9.5 MM (SIDEWALKS, DRIVES, INCIDENTALS) Highway & Bridge Combined	400.000 T				
0300	403.211 HOT MIX ASPHALT (SHIMMING)	500.000 T				
0310	403.2131 12.5 MM POLYMER MODIFIED HMA BASE	29,950.000 T				
0320	403.41 PASS MAPPING TECHNOLOGY FOR ASPHALT APPLICATIONS	LUMP SUM	LUMP SUM			
0330	409.15 BITUMINOUS TACK COAT - APPLIED	15,545.000 G				
0340	501.231 DYNAMIC LOADING TEST	6.000 EA				

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0350	501.50 STEEL H-BEAM PILES 89 LBS/FT, DELIVERED	1,580.000 LF				
0360	501.501 STEEL H-BEAM PILES 89 LBS/FT, IN PLACE	1,580.000 LF				
0370	501.502 ROCK SOCKETED H-PILES	250.000 LF				
0380	501.54 STEEL H-BEAM PILES 117 LBS/FT, DELIVERED	1,030.000 LF				
0390	501.541 STEEL H-BEAM PILES 117 LBS/FT, IN PLACE	746.000 LF				
0400	501.804 DRILLING EQUIPMENT MOBILIZATION	 LUMP SUM	 LUMP SUM			
0410	501.90 PILE TIPS	47.000 EA				
0420	501.903 PILE TIPS - ROCK INJECTOR POINT	10.000 EA				
0430	501.91 PILE SPLICES	69.000 EA				
0440	501.92 PILE DRIVING EQUIPMENT MOBILIZATION Eaton Brook	 LUMP SUM	 LUMP SUM			
0450	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS Clewleyville Road	 LUMP SUM	 LUMP SUM			

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0460	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS Eastern Ave	LUMP SUM	LUMP SUM	_____.____
0470	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS Eaton Brook	LUMP SUM	LUMP SUM	_____.____
0480	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS Felts Brook	LUMP SUM	LUMP SUM	_____.____
0490	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS Lambert Road	LUMP SUM	LUMP SUM	_____.____
0500	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0510	502.26 STRUCTURAL CONCRETE ROADWAY AND SIDEWALK SLABS ON STEEL BRIDGES Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0520	502.26 STRUCTURAL CONCRETE ROADWAY AND SIDEWALK SLABS ON STEEL BRIDGES Eastern Ave	LUMP SUM	LUMP SUM	_____.____
0530	502.26 STRUCTURAL CONCRETE ROADWAY AND SIDEWALK SLABS ON STEEL BRIDGES Eaton Brook	LUMP SUM	LUMP SUM	_____.____

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0540	502.26 STRUCTURAL CONCRETE ROADWAY AND SIDEWALK SLABS ON STEEL BRIDGES Lambert Road	LUMP SUM	LUMP SUM	_____.____
0550	502.26 STRUCTURAL CONCRETE ROADWAY AND SIDEWALK SLABS ON STEEL BRIDGES Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0560	502.291 SAW CUT GROOVING	LUMP SUM	LUMP SUM	_____.____
0570	502.31 STRUCTURAL CONCRETE APPROACH SLABS Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0580	502.31 STRUCTURAL CONCRETE APPROACH SLABS Eastern Ave	LUMP SUM	LUMP SUM	_____.____
0590	502.31 STRUCTURAL CONCRETE APPROACH SLABS Eaton Brook	LUMP SUM	LUMP SUM	_____.____
0600	502.31 STRUCTURAL CONCRETE APPROACH SLABS Lambert Road	LUMP SUM	LUMP SUM	_____.____
0610	502.31 STRUCTURAL CONCRETE APPROACH SLABS Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0620	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALKS Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0630	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALKS Eastern Ave	LUMP SUM	LUMP SUM	_____.____

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0640	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALKS Eaton Brook	LUMP SUM	LUMP SUM	_____.____
0650	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALKS Lambert Road	LUMP SUM	LUMP SUM	_____.____
0660	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALKS Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0670	502.565 CONCRETE FILL	40.000 CY	_____.____	_____.____
0680	503.12 REINFORCING STEEL, FABRICATED AND DELIVERED	54,794.000 LB	_____.____	_____.____
0690	503.13 REINFORCING STEEL, PLACING	54,794.000 LB	_____.____	_____.____
0700	503.26 STAINLESS STEEL REINFORCEMENT - FABRICATED & DELIVERED	454,668.000 LB	_____.____	_____.____
0710	503.27 STAINLESS STEEL REINFORCEMENT - PLACING	454,668.000 LB	_____.____	_____.____
0720	504.702 STRUCTURAL STEEL FABRICATED AND DELIVERED, WELDED Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0730	504.702 STRUCTURAL STEEL FABRICATED AND DELIVERED, WELDED Eastern Ave	LUMP SUM	LUMP SUM	_____.____

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0740	504.702 STRUCTURAL STEEL FABRICATED AND DELIVERED, WELDED Eaton Brook	LUMP SUM	LUMP SUM	_____.____
0750	504.702 STRUCTURAL STEEL FABRICATED AND DELIVERED, WELDED Lambert Road	LUMP SUM	LUMP SUM	_____.____
0760	504.702 STRUCTURAL STEEL FABRICATED AND DELIVERED, WELDED Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0770	504.71 STRUCTURAL STEEL ERECTION Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0780	504.71 STRUCTURAL STEEL ERECTION Eastern Ave	LUMP SUM	LUMP SUM	_____.____
0790	504.71 STRUCTURAL STEEL ERECTION Eaton Brook	LUMP SUM	LUMP SUM	_____.____
0800	504.71 STRUCTURAL STEEL ERECTION Lambert Road	LUMP SUM	LUMP SUM	_____.____
0810	504.71 STRUCTURAL STEEL ERECTION Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0820	505.08 SHEAR CONNECTORS Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0830	505.08 SHEAR CONNECTORS Eastern Ave	LUMP SUM	LUMP SUM	_____.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0840	505.08 SHEAR CONNECTORS Eaton Brook	LUMP SUM	LUMP SUM	_____.____
0850	505.08 SHEAR CONNECTORS Lambert Road	LUMP SUM	LUMP SUM	_____.____
0860	505.08 SHEAR CONNECTORS Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0870	506.9104 THERMAL SPRAY COATING - SHOP APPLIED Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0880	506.9104 THERMAL SPRAY COATING - SHOP APPLIED Eastern Ave	LUMP SUM	LUMP SUM	_____.____
0890	506.9104 THERMAL SPRAY COATING - SHOP APPLIED Eaton Brook	LUMP SUM	LUMP SUM	_____.____
0900	506.9104 THERMAL SPRAY COATING - SHOP APPLIED Lambert Road	LUMP SUM	LUMP SUM	_____.____
0910	506.9104 THERMAL SPRAY COATING - SHOP APPLIED Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0920	507.0821 STEEL BRIDGE RAILING, 3 BAR Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
0930	507.0821 STEEL BRIDGE RAILING, 3 BAR Eastern Ave	LUMP SUM	LUMP SUM	_____.____
0940	507.0821 STEEL BRIDGE RAILING, 3 BAR Eaton Brook	LUMP SUM	LUMP SUM	_____.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0950	507.0821 STEEL BRIDGE RAILING, 3 BAR Lambert Road	LUMP SUM	LUMP SUM	_____.____
0960	507.0821 STEEL BRIDGE RAILING, 3 BAR Levenseller Road	LUMP SUM	LUMP SUM	_____.____
0970	507.0822 STEEL APPROACH RAILING, 3-BAR	20.000 EA	_____.____	_____.____
0980	508.13 SHEET WATERPROOFING MEMBRANE Critter Crossing #1	LUMP SUM	LUMP SUM	_____.____
0990	508.13 SHEET WATERPROOFING MEMBRANE Critter Crossing #2	LUMP SUM	LUMP SUM	_____.____
1000	508.13 SHEET WATERPROOFING MEMBRANE Eaton Tributary	LUMP SUM	LUMP SUM	_____.____
1010	508.13 SHEET WATERPROOFING MEMBRANE Felts Brook	LUMP SUM	LUMP SUM	_____.____
1020	508.13 SHEET WATERPROOFING MEMBRANE Felts Tributary	LUMP SUM	LUMP SUM	_____.____
1030	508.13 SHEET WATERPROOFING MEMBRANE Snow Scooter	LUMP SUM	LUMP SUM	_____.____
1040	508.13 SHEET WATERPROOFING MEMBRANE Snow Sled	LUMP SUM	LUMP SUM	_____.____
1050	508.13 SHEET WATERPROOFING MEMBRANE White Tail Crossing	LUMP SUM	LUMP SUM	_____.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
1060	508.14 HIGH PERFORMANCE WATERPROOFING MEMBRANE Eaton Brook	LUMP SUM	LUMP SUM	_____.____
1070	508.14 HIGH PERFORMANCE WATERPROOFING MEMBRANE Lambert Road	LUMP SUM	LUMP SUM	_____.____
1080	511.07 COFFERDAM: Eaton Brook Abutment 1	LUMP SUM	LUMP SUM	_____.____
1090	511.07 COFFERDAM: Critter Crossing #2 Downstream	LUMP SUM	LUMP SUM	_____.____
1100	511.07 COFFERDAM: Critter Crossing #2 Upstream	LUMP SUM	LUMP SUM	_____.____
1110	511.07 COFFERDAM: Eaton Brook Abutment 2	LUMP SUM	LUMP SUM	_____.____
1120	511.07 COFFERDAM: Eaton Tributary Downstream	LUMP SUM	LUMP SUM	_____.____
1130	511.07 COFFERDAM: Eaton Tributary Upstream	LUMP SUM	LUMP SUM	_____.____
1140	511.07 COFFERDAM: Felts Brook Downstream	LUMP SUM	LUMP SUM	_____.____
1150	511.07 COFFERDAM: Felts Brook Upstream	LUMP SUM	LUMP SUM	_____.____
1160	511.07 COFFERDAM: Felts Tributary Downstream	LUMP SUM	LUMP SUM	_____.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
1170	511.07 COFFERDAM: Felts Tributary Upstream	LUMP SUM	LUMP SUM	_____.____
1180	512.081 FRENCH DRAINS Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
1190	512.081 FRENCH DRAINS Eastern Ave	LUMP SUM	LUMP SUM	_____.____
1200	512.081 FRENCH DRAINS Levenseller Road	LUMP SUM	LUMP SUM	_____.____
1210	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES Clewleyville Road	LUMP SUM	LUMP SUM	_____.____
1220	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES Eastern Ave	LUMP SUM	LUMP SUM	_____.____
1230	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES Eaton Brook	LUMP SUM	LUMP SUM	_____.____
1240	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES Lambert Road	LUMP SUM	LUMP SUM	_____.____
1250	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES Levenseller Road	LUMP SUM	LUMP SUM	_____.____
1260	519.60 EXPANSION DEVICE - ASPHALTIC PLUG JOINT	166.000 LF	_____.____	_____.____
1270	523.52 BEARING INSTALLATION	30.000 EA	_____.____	_____.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
1280	523.5401 LAMINATED ELASTOMERIC BEARINGS, FIXED	15.000 EA	_____.____	_____.____
1290	523.5402 LAMINATED ELASTOMERIC BEARINGS, EXPANSION	15.000 EA	_____.____	_____.____
1300	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED Critter Crossing #1	LUMP SUM	LUMP SUM	_____.____
1310	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED Critter Crossing #2	LUMP SUM	LUMP SUM	_____.____
1320	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED Eaton Tributary	LUMP SUM	LUMP SUM	_____.____
1330	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED Felts Brook	LUMP SUM	LUMP SUM	_____.____
1340	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED Felts Tributary	LUMP SUM	LUMP SUM	_____.____
1350	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED Snow Scooter	LUMP SUM	LUMP SUM	_____.____
1360	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED Snow Sled	LUMP SUM	LUMP SUM	_____.____
1370	534.7101 PRECAST CONCRETE BOX CULVERT - STATE SUPPLIED White Tail Crossing	LUMP SUM	LUMP SUM	_____.____
1380	603.16 15 INCH CULVERT PIPE OPTION I	40.000 LF	_____.____	_____.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1390	603.17 18 INCH CULVERT PIPE OPTION I	306.000 LF				
1400	603.175 18 INCH REINFORCED CONCRETE PIPE CLASS III	608.000 LF				
1410	603.1753 18 INCH REINFORCED CONCRETE PIPE CLASS V	124.000 LF				
1420	603.179 18 INCH CULVERT PIPE OPTION III	50.000 LF				
1430	603.195 24 INCH REINFORCED CONCRETE PIPE CLASS III	664.000 LF				
1440	603.199 24 INCH CULVERT PIPE OPTION III	12.000 LF				
1450	603.209 30 INCH CULVERT PIPE OPTION III	300.000 LF				
1460	603.215 36 INCH REINFORCED CONCRETE PIPE CLASS III	1,520.000 LF				
1470	603.279 72 INCH CULVERT PIPE OPTION III	112.000 LF				
1480	603.41 24 INCH REINFORCED CONCRETE PIPE CLASS IV	136.000 LF				
1490	603.43 36 INCH REINFORCED CONCRETE PIPE CLASS IV	312.000 LF				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1500	603.471 60 INCH REINFORCED CONCRETE PIPE CLASS V	112.000 LF				
1510	603.491 72 INCH REINFORCED CONCRETE PIPE, CLASS V	284.000 LF				
1520	603.53 96 INCH REINFORCED CONCRETE PIPE - CLASS IV	152.000 LF				
1530	603.55 CONCRETE PIPE TIES	82.000 GP				
1540	604.091 CATCH BASIN TYPE B1-P	1.000 EA				
1550	604.092 CATCH BASIN TYPE B1-C	3.000 EA				
1560	604.1581 UTILITY VAULT	 LUMP SUM	LUMP SUM			
1570	605.09 6 INCH UNDERDRAIN TYPE B	1,341.000 LF				
1580	605.13 18 INCH UNDERDRAIN TYPE C	150.000 LF				
1590	606.1301 31” W-BM GR, MID-WAY SPLICE-SGL FACED	17,580.000 LF				
1600	606.1303 31” W-BM GR, MID-WAY SPLICE-15' RAD AND LESS	75.000 LF				
1610	606.1304 31” W-BM GR, MID-WAY SPLICE-OVER 15' RAD	32.000 LF				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1620	606.1305 31” W-BM GR, MID-WAY SPLICE FLARED TERMINAL	36.000 EA				
1630	606.1721 BRIDGE TRANSITION - TYPE 1	20.000 EA				
1640	606.256 TERMINAL CONNECTOR CORROSION RESISTANT STEEL	10.000 EA				
1650	606.353 REFLECTORIZED FLEXIBLE GUARDRAIL MARKER	97.000 EA				
1660	606.356 UNDERDRAIN DELINEATOR POST	10.000 EA				
1670	606.47 SINGLE WOOD POST	4.000 EA				
1680	606.80 BURIED-IN-SLOPE GUARDRAIL END	2.000 EA				
1690	606.95 LOW MAINTENANCE/ SELF RESTORING CRASH CUSHION	1.000 EA				
1700	607.09 WOVEN WIRE FENCE - METAL POSTS	57,350.000 LF				
1710	607.093 DEER ESCAPE JUMP OUT	16.000 EA				
1720	607.15 DRIVE GATEWAY 16 FOOT - METAL	2.000 EA				
1730	607.184 CHAIN LINK SNOW FENCE 3 FOOT	400.000 LF				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1740	607.32 BRACING ASSEMBLY TYPE I - METAL POSTS	71.000 EA				
1750	607.33 BRACING ASSEMBLY TYPE II - METAL POSTS	126.000 EA				
1760	607.491 DRIVE GATEWAY - 36' METAL	2.000 EA				
1770	609.21 CONCRETE SLIPFORM CURB	1,244.000 LF				
1780	609.221 TERMINAL CURB TYPE 1	24.000 LF				
1790	610.08 PLAIN RIPRAP	4,649.000 CY				
1800	610.18 STONE DITCH PROTECTION	500.000 CY				
1810	610.213 VOID FILLED RIPRAP	1,201.000 CY				
1820	610.46 STONE BERM LEVEL LIP SPREADER	112.000 CY				
1830	613.319 EROSION CONTROL BLANKET	18,400.000 SY				
1840	613.40 TURF REINFORCEMENT MAT - (TRM)	468.000 SY				
1850	615.07 LOAM	1,000.000 CY				
1860	615.081 COMPOST BLANKET	1,568.000 CY				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1870	615.10 DIRTY BORROW Highway & Bridge Combined	22,800.000 CY				
1880	615.22 AMENDED FILTER BUFFER	16,195.000 SF				
1890	615.27 UNDERDRAIN SOIL FILTER	 LUMP SUM	LUMP SUM			
1900	618.13 SEEDING METHOD NUMBER 1	10.000 UN				
1910	618.14 SEEDING METHOD NUMBER 2	2,545.000 UN				
1920	618.143 SPECIAL SEED MIX: A	141.000 UN				
1930	618.1452 SPECIAL SEED MIX UNDERDRAIN SOIL FILTER	20.000 UN				
1940	618.146 HGM BIOTIC SOIL HYDROMULCH MEDIA	141.000 UN				
1950	618.147 WETLAND SEEDING	23.000 UN				
1960	619.12 MULCH	2,550.000 UN				
1970	619.14 EROSION CONTROL MIX	150.000 CY				
1980	620.54 STABILIZATION/REINFORCEMENT GEOTEXTILE	4,712.000 SY				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1990	620.58 EROSION CONTROL GEOTEXTILE	7,725.000 SY				
2000	620.65 REINFORCEMENT GEOGRID	1,601.000 SY				
2010	620.66 DRAINAGE GEOCOMPOSITE	69.000 SY				
2020	621.025 EVERGREEN TREES (3 FOOT - 4 FOOT) GROUP A	10.000 EA				
2030	621.026 EVERGREEN TREES (3 FOOT - 4 FOOT) GROUP B	10.000 EA				
2040	621.037 EVERGREEN TREES (5 FOOT - 6 FOOT) GROUP A	10.000 EA				
2050	621.038 EVERGREEN TREES (5 FOOT - 6 FOOT) GROUP B	10.000 EA				
2060	621.043 EVERGREEN TREES (6 FOOT - 8 FOOT) GROUP A	15.000 EA				
2070	621.044 EVERGREEN TREES (6 FOOT - 8 FOOT) GROUP B	10.000 EA				
2080	621.129 SM DECID TR (6' - 8') MULTI STEM CLUMP	10.000 EA				
2090	621.201 MEDIUM DECIDUOUS TREE (2 INCH - 2.50 INCH CALIPER) GROUP A	10.000 EA				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
2100	621.54 DECIDUOUS SHRUBS (18 INCH - 24 INCH) GROUP A	10.000 EA				
2110	621.546 DECIDUOUS SHRUBS (2 FOOT - 3 FOOT) GROUP A	20.000 EA				
2120	621.552 DECIDUOUS SHRUBS (3 FOOT - 4 FOOT) GROUP A	20.000 EA				
2130	626.11 PRECAST CONCRETE JUNCTION BOX	27.000 EA				
2140	626.21 METALLIC CONDUIT	225.000 LF				
2150	626.22 NON-METALLIC CONDUIT 2"	25,750.000 LF				
2160	626.22 NON-METALLIC CONDUIT 3"	25,500.000 LF				
2170	626.22 NON-METALLIC CONDUIT Signing & Lighting	11,500.000 LF				
2180	626.221 NON-METALLIC CONDUIT CONCRETE ENCASED	650.000 LF				
2190	626.251 NON-METALLIC UNDER PAVEMENT CONDUIT (SCHEDULE 80 OR GREATER RATING)	4,600.000 LF				
2200	626.35 CONTROLLER CABINET FOUNDATION	4.000 EA				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars . Cents	Bid Amount Dollars . Cents
2210	626.36 REMOVE OR MODIFY CONCRETE FOUNDATION	25.000 EA	_____._____	_____._____
2220	626.411 18 INCH DIAMETER FOUNDATION	154.000 LF	_____._____	_____._____
2230	626.421 24 INCH DIAMETER FOUNDATION	209.000 LF	_____._____	_____._____
2240	626.43 30 INCH DIAMETER FOUNDATION	603.000 LF	_____._____	_____._____
2250	626.44 36 INCH DIAMETER FOUNDATION	20.000 LF	_____._____	_____._____
2260	626.45 ELECTRICAL CONDUIT, WIRING, & TRENCHING	LUMP SUM	LUMP SUM	_____._____
2270	626.46 48 INCH DIAMETER FOUNDATION	72.500 LF	_____._____	_____._____
2280	627.733 4" WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE	300,000.000 LF	_____._____	_____._____
2290	627.75 WHITE OR YELLOW PAVEMENT & CURB MARKING	10,000.000 SF	_____._____	_____._____
2300	629.05 HAND LABOR, STRAIGHT TIME	300.000 HR	_____._____	_____._____
2310	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	400.000 HR	_____._____	_____._____
2320	631.121 HEAVY DUTY ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	100.000 HR	_____._____	_____._____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
2330	631.13 BULLDOZER (INCLUDING OPERATOR)	100.000 HR				
2340	631.172 TRUCK - LARGE (INCLUDING OPERATOR)	400.000 HR				
2350	631.20 STUMP CHIPPER (INCLUDING OPERATOR)	25.000 HR				
2360	631.32 CULVERT CLEANER (INCLUDING OPERATOR)	25.000 HR				
2370	634.160 HIGHWAY LIGHTING	 LUMP SUM	LUMP SUM			
2380	634.2042 LED LUMINARIES	72.000 EA				
2390	634.210 CONVENTIONAL LIGHT STANDARD	68.000 EA				
2400	639.18 FIELD OFFICE TYPE A	2.000 EA				
2410	639.261 INSTRUMENTATION GEOTECHNICAL - TRADITIONAL SETTLEMENT PLATFORM	 LUMP SUM	LUMP SUM			
2420	643.871 WEIGH-IN-MOTION SYSTEM	 LUMP SUM	LUMP SUM			
2430	643.97 WOOD POLES WITH GUYS AND SPAN WIRE	5.000 EA				
2440	645.103 DEMOUNT GUIDE SIGN	1.000 EA				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
2450	645.106 DEMOUNT REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	14.000 EA	_____.____	_____.____
2460	645.108 DEMOUNT POLE	2.000 EA	_____.____	_____.____
2470	645.113 REINSTALL GUIDE SIGN	1.000 EA	_____.____	_____.____
2480	645.116 REINSTALL REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	14.000 EA	_____.____	_____.____
2490	645.118 REINSTALL POLE	2.000 EA	_____.____	_____.____
2500	645.12 OVERHEAD GUIDE SIGN: STA. 1001+50	LUMP SUM	LUMP SUM	_____.____
2510	645.12 OVERHEAD GUIDE SIGN: STA. 11+40	LUMP SUM	LUMP SUM	_____.____
2520	645.12 OVERHEAD GUIDE SIGN: STA. 48+25	LUMP SUM	LUMP SUM	_____.____
2530	645.12 OVERHEAD GUIDE SIGN: STA. 503+56.50 LT	LUMP SUM	LUMP SUM	_____.____
2540	645.211 CLOSED CIRCUIT TELEVISION (CCTV) SYSTEM	1.000 EA	_____.____	_____.____
2550	645.251 ROADSIDE GUIDE SIGNS, TYPE I	1,024.000 SF	_____.____	_____.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
2560	645.271 REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGNS, TYPE I	540.000 SF	_____	.____	_____	.____
2570	645.289 STEEL H-BEAM POLES	10,000.000 LB	_____	.____	_____	.____
2580	645.292 REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGNS TYPE II	500.000 SF	_____	.____	_____	.____
2590	645.3065 FIBER OPTIC DELINEATOR	85.000 EA	_____	.____	_____	.____
2600	652.312 TYPE III BARRICADE	12.000 EA	_____	.____	_____	.____
2610	652.33 DRUM	250.000 EA	_____	.____	_____	.____
2620	652.34 CONE	500.000 EA	_____	.____	_____	.____
2630	652.35 CONSTRUCTION SIGNS	1,500.000 SF	_____	.____	_____	.____
2640	652.36 MAINTENANCE OF TRAFFIC CONTROL DEVICES	1,000.000 CD	_____	.____	_____	.____
2650	652.38 FLAGGER	15,000.000 HR	_____	.____	_____	.____
2660	652.41 PORTABLE CHANGEABLE MESSAGE SIGN	8.000 EA	_____	.____	_____	.____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
2670	654.223 SEMI-PERMANENT PAD-MOUNTED VARIABLE MESSAGE SIGN	3.000 EA				
2680	654.31 ITS EQUIPMENT CABINET	4.000 EA				
2690	654.311 FIBER ETHERNET SWITCH	5.000 EA				
2700	654.312 UNINTERRUPTIBLE POWER SUPPLY (UPS)	3.000 EA				
2710	654.332 COMMUNICATIONS DROP	 LUMP SUM	 LUMP SUM			
2720	654.3331 FIBER OPTIC PATCH PANEL (12-POSITION)	5.000 EA				
2730	654.3332 SPLICE ENCLOSURE Span Wire Mounting	1.000 EA				
2740	654.3332 SPLICE ENCLOSURE Splice Enclosure	10.000 EA				
2750	654.3333 SINGLE MODE FIBER OPTIC CABLE 12-STRAND	525.000 LF				
2760	654.3333 SINGLE MODE FIBER OPTIC CABLE 24-STRAND	325.000 LF				
2770	654.3333 SINGLE MODE FIBER OPTIC CABLE 48-STRAND	32,000.000 LF				

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
2780	654.3334 FIBER OPTIC SPLICE	430.000 EA				
2790	654.3335 FIBER OPTIC MANHOLE	25.000 EA				
2800	654.53 ROAD WEATHER INFORMATION STATION	1.000 LS				
2810	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP SUM	LUMP SUM			
2820	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL Levenseller	LUMP SUM	LUMP SUM			
2830	659.10 MOBILIZATION	LUMP SUM	LUMP SUM			
2840	659.10 MOBILIZATION Levenseller	LUMP SUM	LUMP SUM			
2850	660.21 ON-THE-JOB TRAINING (BID)	7,000.000 HR				
2860	677.20 MECHANICALLY STABILIZED EARTH RETAINING WALL	4,533.000 SF				
2870	822.36 12 INCH DUCTILE IRON PIPE	250.000 LF				
2880	822.36 12 INCH DUCTILE IRON PIPE Levenseller	250.000 LF				
2890	822.37 16 " DUCTILE IRON PIPE Eastern Ave	405.000 LF				

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Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
2900	823.31 12 INCH GATE VALVE Levenseller	2.000 EA				
2910	823.325 8 INCH GATE VALVE Eastern Ave	2.000 EA				
2920	823.331 6 INCH GATE VALVE	2.000 EA				
2930	823.331 6 INCH GATE VALVE Levenseller	2.000 EA				
2940	823.375 16" BUTTERFLY VALVE Eastern Ave	2.000 EA				
2950	824.3010 HYDRANT ASSEMBLY Eastern Ave	2.000 EA				
2960	824.3010 HYDRANT ASSEMBLY Levenseller	2.000 EA				
2970	825.5411 TEMPORARY WATER MAIN 8" - Eastern Ave	LUMP SUM	LUMP SUM			
2980	825.5411 TEMPORARY WATER MAIN Levenseller	LUMP SUM	LUMP SUM			
2990	830.10 WATER MAIN BRIDGE CROSSING 16" - Eastern Ave	LUMP SUM	LUMP SUM			
3000	830.10 WATER MAIN BRIDGE CROSSING Levenseller	LUMP SUM	LUMP SUM			
3010	832.071 CONTRACTOR ALLOWANCE Eastern Ave	LUMP SUM	LUMP SUM		10,000	.00

Proposal ID: 018915.00 Project(s): 018915.00

SECTION: 1 DOT Items

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
3020	832.071 CONTRACTOR ALLOWANCE Levenseller	LUMP SUM	LUMP SUM		10,000	.00
3030	910.301 SPECIAL WORK Utility Conduit Underground - Lambert	LUMP SUM	LUMP SUM		_____	._____
	Section: 1		Total:		_____	._____
			Total Bid:		_____	._____

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and

_____

a corporation or other legal entity organized under the laws of the State of _____, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, **WIN. 018915.00** for **New Connector Construction** in the city/town of **Brewer - Eddington**, County of **Penobscot** Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **July 18 2025.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the *State of Maine Department of Transportation Standard Specifications, March 2020 Edition* and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

_____

$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in the Federal Contract Provisions Supplement, and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, *Standard Specifications March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

WIN. 018915.00 - New Connector Construction - in the city/town of Brewer/ Eddington

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items."

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items," which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the *Standard Specifications, March 2020 Edition*, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the *Standard Specifications March 2020 Edition* and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: Bruce A. Van Note, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and

_____

a corporation or other legal entity organized under the laws of the State of _____, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, **WIN. 018915.00** for **New Connector Construction** in the city/town of **Brewer - Eddington**, County of **Penobscot** Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **June 24, 2022.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the *State of Maine Department of Transportation Standard Specifications, March 2020 Edition* and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

_____

$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in the Federal Contract Provisions Supplement, and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, *Standard Specifications March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

WIN. 018915.00 - New Connector Construction - in the city/town of Brewer/ Eddington

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items."

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items," which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the *Standard Specifications, March 2020 Edition*, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the *Standard Specifications March 2020 Edition* and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: Bruce A. Van Note, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and **(Name of the firm bidding the job)** a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at **(address of the firm bidding the job)**

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

SAMPLE

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, PIN No.01**12345.00**, for the **Hot Mix Asphalt Overlay** in the town/city of **South Nowhere,** County of **Washington**, Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **November 15, 2006.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the *State of Maine Department of Transportation Standard Specifications, March 2020 Edition* and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is **(Place bid here in alphabetical form such as One Hundred and Two dollars and 10 cents)** **$ (repeat bid here in numerical terms, such as $102.10)** Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition*, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to Division 100 of the *Standard Specifications March 2020 Edition* (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

SAMPLE

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition*, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN 012345.00 South Nowhere, Hot Mix Asphalt Overlay,

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items."

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

SAMPLE

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items," which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the *Standard Specifications, March 2020 Edition*, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the *Standard Specifications March 2020 Edition* and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	**(Sign Here)**
Date	(Signature of Legally Authorized Representative of the Contractor)
(Witness Sign Here)	**(Print Name Here)**
Witness	(Name and Title Printed)

SAMPLE

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: Bruce A. Van Note, Commissioner
_____	
(Witness)	

BOND # _____

CONTRACT PERFORMANCE BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ **in the State of** _____, as principal, and……....., a corporation duly organized under the laws of the State of ..... and having a usual place of business ...., as Surety, are held and firmly bound unto the Treasurer of the State of Maine in the sum of _____ **and 00/100 Dollars ($),** to be paid said Treasurer of the State of Maine or his successors in office, for which payment well and truly to be made, Principal and Surety bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the Contract to construct Project Number _____ in the Municipality of _____ promptly and faithfully performs the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the State of Maine.

Signed and sealed this ..... day of ....., 20….. .

WITNESSES:	SIGNATURES:
	CONTRACTOR:
Signature.....	.....….....
Print Name Legibly	Print Name Legibly ...……....
	SURETY:
Signature	....……....
Print Name Legibly	Print Name Legibly .....
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
.....	ADDRESS .....
.....	...……....
.....	.....…….....
TELEPHONE.....	.....…….....

SAMPLE

BOND # _____

CONTRACT PAYMENT BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ **in the 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 Treasurer of the State of Maine for the use and benefit of claimants as herein below defined, in the sum of _____ **and 00/100 Dollars ($)** for the payment whereof Principal and Surety bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the Contract to construct Project Number _____ in the Municipality of _____ promptly satisfies all claims and demands incurred for all labor and material, used or required by him in connection with the work contemplated by said Contract, and fully reimburses 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.

A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material or both, used or reasonably required for use in the performance of the contract.

Signed and sealed this ..... day of ...…….....…., 20 ... .

WITNESS:	SIGNATURES:
	CONTRACTOR:
Signature…….....	.....….....
Print Name Legibly .....……..	Print Name Legibly ….....….....
	SURETY:
Signature.....	...….....….....
Print Name Legibly	Print Name Legibly ….....….....
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
...….....….....	ADDRESS ….....….....
.....	…….....….....
TELEPHONE	…….....….....

SAMPLE

SPECIAL PROVISION
SECTION 103
AWARD AND CONTRACTING
(Post-Bid, Pre-Award Qualifications)

After Bid Opening and as a condition for Award of the Contract, the lowest responsive bidder must establish they are qualified to conduct the ITS work included in this Contract. A bidder may establish their qualifications in one of the ways listed below.

1. Bidder shall be prequalified by the Maine Department of Transportation under the Highway and/or Traffic Signals/Lighting category, AND include an employee or subcontractor that can demonstrate the requisite experience (to the Department's satisfaction) to be the System Integrator as described in Special Provision 654 and as described in the Post-bid Qualification Submittal requirements below.

2. Bidder shall demonstrate the requisite experience (to the Department's satisfaction) to be the System Integrator as described in Special Provision 654 and as described in the Post-bid Qualification Submittal requirements below, AND include a subcontractor that is prequalified by the Maine Department of Transportation under the Highway and/or Traffic Signals/Lighting category.

3. Bidder shall submit documentation to demonstrate to the Department's satisfaction that the Bidder has recent experience with the installation of Road Weather Information Stations (RWIS) equipment. The Bidder shall also submit documentation to demonstrate to the Department's satisfaction that the Bidder has experience with software modifications and system integration into an advanced transportation management system (ATMS) and has an employee or subcontractor who can perform the System Integrator role as described in Special Provision 654 and as described in the Post-bid Qualification Submittal requirements below.

The Department will provide the Bidder with written Notice of Post-Bid Qualifications requiring the Bidder to provide written documentation presenting evidence of qualifications.

Contractor Requirements

In order to be considered for the award of this contract, the Bidder and key employees that will be assigned to the Work in this Contract shall demonstrate to the Department's satisfaction that the Bidder has completed at least one project in the previous five years that included at least three of the critical components of this Work as listed below.

- Installation of road weather information station (RWIS) system equipment and hardware.

- Installation and configuration of a weigh-in-motion system.
- Installation, splicing and testing of fiber optic cable.
- Development and execution of intelligent transportation systems (ITS) test plans.
- Integration of ITS field equipment and system data into an ATMS.

The Contractor shall maintain current licenses, authorizations, ratings and registrations for the duration of the contract.

The Bidder shall be able to comply with the Contract Requirements, be able to deliver according to the contract schedule, and have a history of satisfactory performance.

The Bidder must have a current, applicable Safety Plan on file with the Department or must submit, prior to Contract award, an acceptable, current Safety Plan or Project and Site Specific Safety Plan to the Department which identifies and addresses job hazards of the expected contract work and complies with all applicable federal, State, and local laws governing safety including all applicable laws and regulations of Occupational Safety and Health Administration (OSHA).

The Bidder may be required to provide any information requested in the "Contractor's Prequalification Application" form adopted by the Department.

Post-bid Qualification Submittals

The Department will notify the Apparent Successful Bidder of the requirements for post-bid, pre-award qualifications and the Bidder shall provide all of the items within seven (7) days of the notice. The Contractor shall submit two copies or an electronic copy of all required submittals to the Department.

The Bidder will be required to submit evidence of compliance with all Contractor Requirements set forth in this Contract.

The Department is willing to consider RWIS equipment that does not strictly conform to the requirements identified in Special Provision 654. If a Bidder cannot certify that the products and materials they intend to provide for this Contract strictly comply with the requirements identified in Special Provision 654, the Bidder will be required to submit an itemized list of the deviations from the specifications along with written justification that describes why the Bidder has determined that the product(s) and/or material(s) they intend to provide is/(are) a reasonable equivalent alternative. The Bidder will also be required to provide three references (owner's name, point of contact name, phone number, email address, and physical address) that can certify that the Bidders product(s) and/or material(s) have been in use elsewhere in the United States providing equivalent functionality.

The Bidder shall be required to submit written documentation setting forth the experience of the Bidder and subcontractor(s) who will be performing the Work specified in the

contract documents, including a description of similar construction projects completed in the last five (5) years that highlight the Bidder's and subcontractors' related experience. Such information shall include:

1. the Company's history and experience of work related specifically to the Scope of Work in this contract;
2. the name of the owner for whom the work was performed;
3. the name and telephone number of a contact person;
4. a description of the work performed by the Bidder or their subcontractor; and
5. the total construction cost of each project, and the value of work performed by the Bidder or their subcontractor.

The Bidder may be required to submit the relevant experience of the key personnel and supervisors who will be performing Work under this contract, their experience and number of years performing work related specifically to the Scope of Work in this contract.

The Bidder's submittal may be required to include a statement describing the personnel and equipment available for the Work and demonstrating that the Bidder is able to deliver according to the contract schedule.

The Bidder's submittal shall include the qualifications, to the Department's satisfaction, that the designated System Integrator has experience working with an ATMS, with RWIS equipment, and with ITS equipment testing. Work with New England Compass ATMS as developed by the Southwest Research Institute (SwRI) will be granted automatic qualification as a System Integrator without being required to submit documentation.

If a Bidder has not previously submitted Traffic Control Plans (TCP) and Soil Erosion and Water Pollution Control Plans (SEWPCP) for other Department projects, the Contractor must submit, prior to Contract award, a substantially complete, acceptable, project specific Traffic Control Plan and Soil Erosion and Water Pollution Control Plan.

If the Department has comments regarding the Contractor's TCP or SEWPCP submittal, the Contractor shall implement and address these prior to beginning Work. No review or comment by the Department, or any failure to review or comment, shall absolve the Contractor of its responsibility to develop and implement the safety plan in accordance with the Contract, or to shift any responsibility to the Department.

If the Bidder is to provide any information requested in the "Contractor's Prequalification Application" form adopted by the Department, the Notice of Post-Bid Qualifications shall so state.

If a current, applicable copy of the Contractor's Safety Plan is not on file with the Department, the Contractor must submit, an acceptable, current Contractor's Safety Plan or Project and Site Specific Safety Plan to the Department in accordance with Special Provision Section 105 Safety Plan. The plan shall identify and addresses job hazards of

the expected contract work and comply with all applicable federal, State, and local laws governing safety including all applicable laws and regulations of Occupational Safety and Health Administration (OSHA).

Using the Bidder's OSHA 200 & 300 Log and statements provided by applicable insurance, the Bidder may be required to provide its workers' compensation Experience Modification Rate.

Upon receipt of the pre-award submittals, the Department will review the submissions and determine if the submitted evidence or information satisfies the Department requirement that the bidder is qualified to properly carry out the terms of the Contract.

The qualifications submitted will be checked for general conformance with the concept of the project and compliance with the requirements set out in the Contract Documents. This review does not modify the Contractor's duty to comply with the Contract documents.

Bidders shall ensure that all information required herein is submitted. Provision of inaccurate information or failure to provide all completed and required information may result in the Bidder being determined to be "Not Qualified" or disqualified as non-responsive. Within 14 days, the Department will review the project specific safety plan, the Traffic Control Plan and the SEWPCP for completeness, conformity with Federal and State requirements, Contract provisions, applicable laws and regulations of Occupational Safety and Health Administration (OSHA), the current edition of the MUTCD, and Department policy and procedures. The Department reserves the right to communicate in writing with Bidders, if needed, to obtain additions to and/or clarification of information contained in the submittals received. No review or comment by the Department, or any failure to review or comment, shall absolve the Contractor of its responsibility to develop and implement the safety plan, TCP or SEWPCP in accordance with the Contract, or to shift any responsibility to the Department. The Bidder shall have 3 days to submit additions and clarifications. The Bidder will have no additional opportunity to submit or clarify information. The Department will not provide an opportunity for the Bidder to meet to present evidence.

Based on these submissions, the Department will make one of the following determinations:

1. Qualified - The Contractor has satisfied the post-bid, pre-award qualification requirements and demonstrated to the Department's satisfaction that it is responsible, can meet the Contractor Requirements set forth in this contract, and is qualified to perform this type of work.
2. Not Qualified - Bidder is not qualified to properly carry out the terms of the Contract and/or the submission does not meet specifications and accepted standards and is not acceptable, as determined by the Department.

There is no Appeal process and the determination of "Not Qualified" is final. The Department will reject the bid as non-responsive, and the Award process will proceed without the unqualified Bidder.

The Department will notify the Bidder of its determination in writing. If a determination of "Not Qualified" is rendered, the notice will set forth reasons to the extent practical. Such reasons may include the following:

A. Not meeting contract Contractor Requirements.

B. Insufficient experience with the critical components of the work listed above.

C. Insufficient qualifications for the designated System Integrator.

D. No Safety Plan or Project and Site-Specific Safety Plan or an unacceptable Safety Plan or Project and Site-Specific Safety Plan.

E. Default(s) or termination(s) on past or current Contracts.

F. Failure to pay or settle all bills for labor, materials or services on past or current Contracts.

G. Failure to provide Closeout Documentation on past or current Contracts.

H. Failure to fulfill warranty obligations on past or current Contracts.

I. Failure to comply with directives of the Department on past or current Contracts.

J. "Below Standard" performance as determined from the Department's Contractor's Performance Rating process.

K. Inability of the Contractor to obtain or retain performance or Payment Bonds meeting MDOT requirements.

L. Failure to accept an Award of a Contract made by the Department to the Contractor.

M. Making materially false, deceptive, or misleading Statements or omissions, whether or not under oath, regarding a claim on prior Contracts or on the Contractor's Prequalification Application or the Post-Bid Qualifications submittals.

N. Failure to provide information requested by the Department pursuant to this Special Provision.

O. Any of the reasons contained in Section 102.02 of the "Rules Regarding Debarment of Contractors", Maine Department of Transportation Register 17-229, Chapter 102 (October 2, 1985).

P. Debarment or suspension by any federal, State, or local governmental procurement agency or the Contractor's Agreement to refrain from Bidding as part of the settlement with any such agencies.

Q. Other serious misconduct that the Department reasonably determines will substantially and adversely affect the cost, quality or timeliness of Work, or the safety of Workers or the public.

"General Decision Number: ME20210047 01/01/2021

Superseded General Decision Number: ME20200047

State: Maine

Construction Type: Highway

County: Penobscot County in Maine.

HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

* ENGI0004-004 04/01/2018

	Rates	Fringes
POWER EQUIPMENT OPERATOR: Grader/Blade, Mechanic, Paver (Asphalt, Aggregate, and Concrete), Roller Asphalt	$ 22.61	12.50

TEAM0340-003 01/01/2017

	Rates	Fringes
TRUCK DRIVER (Vacuum Truck)	$ 14.84	13.08

SUME2014-042 06/23/2017

	Rates	Fringes

CARPENTER, Includes Form Work	$ 18.95	3.23
CEMENT MASON/CONCRETE FINISHER	$ 19.27	1.13
ELECTRICIAN	$ 25.78	6.83
IRONWORKER, REINFORCING	$ 21.85	0.00
IRONWORKER, STRUCTURAL	$ 22.33	4.50
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor	$ 17.08	2.48
LABORER: Common or General	$ 12.83	2.20
LABORER: Landscape	$ 17.03	2.81
OPERATOR: Backhoe/Excavator/Trackhoe	$ 16.33	2.78
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 19.26	5.57
OPERATOR: Broom/Sweeper	$ 18.77	0.00
OPERATOR: Bulldozer	$ 21.71	5.67
OPERATOR: Loader	$ 18.94	7.66
OPERATOR: Milling Machine	$ 26.83	7.05
OPERATOR: Roller (Earth)	$ 17.61	2.97
TRAFFIC CONTROL: Flagger	$ 9.00	0.00
TRAFFIC CONTROL: Laborer-Cones/ Barricades/Barrels - Setter/Mover/Sweeper	$ 17.02	5.37
TRUCK DRIVER: Dump Truck	$ 14.56	6.32

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information

on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate

that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative

Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION
"

THIS DOCUMENT MUST BE CLEARLY POSTED AT ALL CONSTRUCTION SITES FUNDED IN PART WITH STATE FUNDS

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

Wage Determination - In accordance with 26 MRS §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.

2021 Fair Minimum Wage Rates
Highway & Earth Penobscot County

Occupation Title	Minimum Wage	Minimum Benefit	Total
Asphalt Raker	$ 19.06	$ 4.68	$ 23.74
Backhoe Loader Operator	$ 33.80	$ 10.28	$ 44.08
Boom Truck (Truck Crane) Operator	$ 25.00	$ 5.86	$ 30.86
Bulldozer Operator	$ 20.00	$ 1.88	$ 21.88
Carpenter - Rough	$ 30.76	$ 19.72	$ 50.48
Cement Mason/Finisher	$ 20.50	$ 1.42	$ 21.92
Communication Equip Installer	$ 22.00	$ 0.00	$ 22.00
Crane Operator =>15 Tons)	$ 29.00	$ 6.68	$ 35.68
Crusher Plant Operator	$ 22.96	$ 7.90	$ 30.86
Electrician - Licensed	$ 31.98	$ 17.24	$ 49.22
Electrician Helper/Cable Puller	$ 18.50	$ 2.39	$ 20.89
Excavator Operator	$ 23.74	$ 2.26	$ 26.00
Fence Setter	$ 18.50	$ 2.00	$ 20.50
Flagger	$ 13.75	$ 0.00	$ 13.75
Grader/Scraper Operator	$ 26.29	$ 10.70	$ 36.99
Highway Worker/Guardrail Installer	$ 19.60	$ 1.40	$ 21.00
Hot Top Plant Operator	$ 23.91	$ 13.25	$ 37.16
Industrial Truck (Forklift) Operator	$ 26.83	$ 3.25	$ 30.08
Ironworker - Reinforcing	$ 28.36	$ 0.00	$ 28.36
Laborer - Skilled	$ 18.32	$ 3.52	$ 21.84
Laborers (Helpers & Tenders)	$ 18.00	$ 1.01	$ 19.01
Loader Operator - Front-End	$ 22.00	$ 7.62	$ 29.62
Mechanic- Maintenance	$ 22.75	$ 1.59	$ 24.34
Millwright	$ 25.75	$ 5.41	$ 31.16
Painter	$ 20.90	$ 2.07	$ 22.97
Paver Operator	$ 23.91	$ 13.25	$ 37.16
Pipelayer	$ 25.00	$ 3.36	$ 28.36
Reclaimer Operator	$ 26.83	$ 13.25	$ 40.08
Roller Operator - Earth	$ 23.91	$ 2.97	$ 26.88
Roller Operator - Pavement	$ 23.91	$ 9.21	$ 33.12
Screed/Wheelman	$ 20.00	$ 3.01	$ 23.01
Stone Mason	$ 25.00	$ 1.88	$ 26.88
Truck Driver - Heavy	$ 19.49	$ 4.13	$ 23.62
Truck Driver - Light	$ 24.15	$ 0.38	$ 24.53
Truck Driver - Medium	$ 19.25	$ 1.09	$ 20.34
Truck Driver - Tractor Trailer	$ 18.00	$ 0.00	$ 18.00

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.

Title 26 §1310 requires that a clearly legible statement of all fair minimum wage and benefits rates to be paid the several classes of laborers, workers and mechanics employed on the construction on the public work must be kept posted in a prominent and easily accessible place at the site by each contractor and subcontractor subject to sections 1304 to 1313.

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.

A true copy

Attest: Scott R. Cotnoir

Scott R. Cotnoir
Wage & Hour Director
Bureau of Labor Standards

Expiration Date: 12-31-2021
Revised 2-25-2021

SPECIAL PROVISION
SECTION 104
(WAGE RATES)

When two or more wage rate schedules appear in the bid Book, the highest rate shall prevail for each classification.

Town: **Brewer- Eddington**
Project: **18915.00**
Date: **July 27, 2021**

SPECIAL PROVISIONS
SECTION 104
Utilities

UTILITY COORDINATION

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

THE CONTRACTOR SHALL PLAN AND CONDUCT WORK ACCORDINGLY.

MEETING

A Preconstruction Utility Conference, as defined in Subsection 104.4.6 of the Standard Specifications **IS Required**.

GENERAL INFORMATION

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

Overview:

Utility/Railroad	Aerial	Underground	Railroad
Bangor Gas Company		X	
Bangor Water District		X	
Brewer Water Department		X	
Charter Communications	X		
Consolidated Communications	X		
Versant Power	X		
Maine Electric Power Co	X		
Maine Dot Railroad			X
City of Brewer		X	

Utility Contact Information		
Utility/Railroad	**Contact Person**	**Contact Phone**
Bangor Gas Company	Ryan Rancourt	941-9595
Bangor Gas Company	Mike Hussey	570-3821
Bangor Water District	Kyle Killip	947-4516
Brewer Water Department	Rodney Butler	989-4214
Charter Communications	Frank Varrelmann	249-0733
Consolidated Communications	Stephen Ogden	735-8602
Versant Power	Dave Perkins	941-6684
Maine Electric Power Co	Gil Paquette (VHB)	207-889-3102

Maine Dot Railroad	Greg Gay	592-1766
City of Brewer	Jeremy Caron	478-2208

Temporary utility adjustments **{are}** anticipated. If any unexpected utility relocations become necessary, they shall be scheduled in accordance with Section 104 of the Standard Specifications and shall be performed by the appropriate utility company in conjunction with the work by the Contractor. Should the Contractor choose to have any poles temporarily relocated, all work shall be done at the Contractor's request and expense, with no additional cost or schedule impacts to the Department.

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

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

Fire hydrants shall not be disturbed until all necessary work has been accomplished to provide proper fire protection.

All clearing and tree removal in areas where utilities are involved must be completed before the utilities are able to relocate their facilities.

It is the responsibility of the Contractor with the Utility Pole owner, to layout all of the proposed pole locations in the field prior to the start of utility relocations. Should any adjustments be needed, the Utility will document adjustments and inform the Department prior to utility relocations.

The Contractor shall provide the utilities access to the new pole locations. Construction of any spot cuts or fills in excess of 2 feet must be completed prior to utility relocations. The Contractor shall prepare a plan for how access and the spot cuts and fills will be accomplished and what the schedule will be for performing the work. This plan will be discussed at the pre-construction utility meeting.

***** Specific information regarding the line voltage can be requested from* {Versant Power} ****

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

AERIAL EASTERN AVENUE

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimated Working Days
Versant Power	X	X		X	10
Charter Communications		X			15
Consolidated Communications		X			6
				Total:	**31**

Utility Specific Issues:

Pole list for Eastern Avenue

Existing Pole #	Existing Station	Left/ Right		Existing Offset	Proposed Station	Left/ Right		Proposed Offset	Comments
		LT	RT			LT	RT		
Eastern Ave									
Joint 86					**1+75**	**X**		**26'**	**Proposed Pole**
Joint 87	3+36		X	17'					Remove Existing Pole
					3+49	**X**		**26'**	**Proposed Pole**
Joint 88	4+58		X	18'					Remove Existing Pole
					4+48	**X**		**26'**	**Proposed Pole**
					7+52	**X**		**26'**	**Proposed Pole**
					4+54	**X**		**24'**	**Proposed Service Pole**

Versant Power

Versant Power will be setting 4 new poles and removing 2 old poles as per pole list provided in this special provision. Versant Power will frame and run new wire to these poles upon completion of all utility work Versant Power will remove old poles.

Charter Communications

Once Versant has completed their work Charter Communications will attach/ splice their facilities to the new locations.

Consolidated Communications

Once Charter has completed their work Consolidated Communications will attach / splice their facilities to the new locations.

Town: **Brewer- Eddington**
Project: **18915.00**
Date: **July 27, 2021**

AERIAL LAMBERT ROAD

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimated Working Days
Versant Power	X	X		X	15
Charter Communications		X			30
Consolidated Communications		X			8
				Total:	**53**

Pole list for Lambert Road

Existing Pole #	Existing Station	Left/ Right		Existing Offset	Proposed Station	Left/ Right		Proposed Offset	Comments
		LT	RT			LT	RT		
					6+70		**X**	**24'**	**Proposed Riser Pole**
#41	8+10	X		19'					Remove Existing Pole
No#	11+11	X		21'					Remove Existing Pole
#2	11+23		X	10'					Remove Existing Pole
					12+55		**X**	**25'**	**Proposed Riser Pole**

Versant Power

Versant Power will be setting two riser poles as per pole list provided within this special provision. Versant Power has entered into an agreement for construction of an underground duct bank to be constructed by MaineDOT Contractor. (**See Subsurface Utility Specific Issues Page 11 of 12**). Once Versant Power and all other utility companies have completed their work involving the underground duct bank, Versant Power will be removing 3 existing poles and wrecking out their facilities.

Charter Communications

Charter Communications has entered into an agreement for construction of an underground duct bank to be constructed by MaineDOT Contractor. (**See Subsurface Utility Specific Issues Page 11 of 12**). Once Charter Communications has completed their work involving the underground duct bank Charter Communications will wreck out their existing aerial facilities.

Consolidated Communications

Consolidated Communications has entered into an agreement for the construction of an underground duct bank to be constructed by MaineDOT Contractor. (**See Subsurface Utility Specific Issues Page 11 of 12**). Once Consolidated has completed their work involving the underground duct bank Consolidated Communications will wreck out their existing aerial facilities.

Town: **Brewer- Eddington**
Project: **18915.00**
Date: **July 27, 2021**

AERIAL CLEWLEYVILLE ROAD

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimated Working Days
Versant Power	X	X		X	15
Charter Communications		X			15
Consolidated Communications		X			8
				Total:	**38**

Pole list Clewleyville Road

Existing Pole #	Existing Station	Left/ Right		Existing Offset	Proposed Station	Left/ Right		Proposed Offset	Comments
		LT	RT			LT	RT		
Clewleyville									
Joint 9	6+19	X		21					Remove Existing Pole
					6+20	**X**		**30'**	**Proposed Pole**
					6+40		**X**	**30'**	**Proposed D Pole**
Joint 8	8+22	X		22'					Remove Existing Pole
					9+14	**X**		**30'**	**Proposed pole**
Joint 7	10+21	X		22'					Remove Existing Pole
Joint 7D	10+80		X	19'					Remove Existing Pole
					10+81	**X**		**25.5'**	**Proposed Pole**

Versant Power

Versant Power will be setting 4 new poles and removing 4 old poles as per pole list provided in this special provision. Versant Power will frame and run new wire to these poles. Once all other utilities have completed their work Versant Power will remove the old poles.

Charter Communications

Once Versant has completed their work Charter Communications will attach / splice their facilities to the new locations.

Consolidated Communications

Once Charter has completed their work Consolidated Communications will attach / splice their facilities to the new locations.

AERIAL LEVENSELLER ROAD

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimated Working Days
Versant Power	X	X		X	10
Charter Communications		X			15
Consolidated Communications		X			6
				Total:	**31**

Pole list for Levenseller Road bridge crossing.

Existing Pole #	Existing Station	Left/ Right		Existing Offset	Proposed Station	Left/ Right		Proposed Offset	Comments
		LT	RT			LT	RT		
					6+05	**X**		**31'**	**Proposed Pole**
					6+05	**X**		**31'**	**Proposed Push Brace**
Joint30/35	6+46		X	37'					Remove Existing Pole
					8+95	**X**		**28'**	**Proposed Pole**
Joint #36	9+70		X	21'					Remove Existing Pole
					6+28	**X**		**32'**	**Proposed Service Pole**

Versant Power

Versant Power will be setting 2 new poles 1 push brace and removing 2 old poles as per pole list provided in this special provision. Versant Power will frame and run new wire to these poles. Versant will be placing alley arms on proposed poles at station 6+05 LT and 8+95Lt for added clear zone from power.
Versant Power will be constructing two new service entrances at station 6+00Lt and at Station 8+95Lt.
Pole locations are to be determined in the field.

Charter Communications

Once Versant has completed their work Charter Communications will attach / splice their facilities to the new locations.

Consolidated Communications

Once Charter Communications has completed their work Consolidated Communications will attach / splice their facilities to the new pole locations.

Town: **Brewer- Eddington**
Project: **18915.00**
Date: **July 27, 2021**

AERIAL ROUTE 9 ALIGNMENT

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimated Working Days
Versant Power	X	X		X	30
Charter Communications		X			30
Consolidated Communications		X			15
				Total:	**75**

Pole List: Route 9 Connector Route 9 New Alignment WIN 18915.00

Existing Pole #		Existing Station	Left/ Right		Existing Offset	Proposed Station	Left/ Right		Proposed Offset	Comments
			LT	RT			LT	RT		
(123)		400+62		X	38.5’					Remove Dual Pole
122	137435	402+39		X	40.4’					Remove Existing Pole
						402+41		**X**	**40.4**	**Proposed Pole**
121	137438	403+90		X						Remove Existing Pole
					39.6’	**403+89**		**X**	**39.6**	**Proposed Pole**
					50.4’	**405+16**	**X**		**40’**	**Proposed Pole**
120	137448	405+38		X						Remove Existing Pole
					39.4’	**405+67**	**X**		**40’**	**Proposed Pole**
120D		405+57	X							Remove Existing Pole
119	137447	406+93		X	36.4’					Remove Existing Pole
119D						**407+60**		**X**	**40’**	**New D Pole**
						407+65	**X**		**59’**	**Proposed Pole**
119D1						**408+51**	**X**		**118’**	**New “D” Pole**
118D	137441	407+94	X		85.9’					Remove Existing Pole
118	137449	408+42	X		15.3’					Remove Existing Pole
						409+70	**X**		**33’**	**Proposed Pole**

118DD	137442		X							Remove Existing Pole
117S						**324+50**	**X**		**44'**	**New Stub Pole**
						326+25	**X**		**44'**	**Proposed Pole**
117SS						**326+40**		**X**	**40'**	**New Stub Pole**
						328+25	**X**		**44'**	**Proposed Pole**
						330+25	**X**		**34'**	**Proposed Pole**
						332+25	**X**		**38'**	**Proposed Pole**
						334+25		**X**	**38'**	**Proposed Pole**
						334+34	**X**		**118'**	**Proposed Pole**
112	137254	335+48		X	2.3'					Remove Existing Pole
						336+50		**X**	**38'**	**Proposed Pole**
111	137255	337+32		X	24.1'					Remove Existing Pole
						338+80		**X**	**38'**	**Proposed Pole**
110	137256	338+78	X		47.4'					Remove Existing Pole
109	137257	340+28	X		44.5'					Remove Existing Pole
						340+75		**X**	**38,**	**Proposed Pole**
108	137258	341+80	X		40.6'					Remove Pole
						343+00		**X**	**38'**	**Proposed Pole**
107	137259	343+31	X		37.8'					Leave as "D" Pole - 109D
106	137260	344+95	X		34.3'					Remove Pole
106S	137262			X						Remove Pole
						344+45		**X**	**38'**	**Proposed Pole**
						345+90		**X**	**38'**	**Proposed Pole**
113	137252	5996+21	X		33.9'					Remove Existing Pole
114	137251	5997+82	X		37.6'					Remove Existing Pole
115	137450	5999+62	X		30.0'					Remove Existing Pole
119D2						**6002+27**		**X**	**29'**	**New "D" Pole**
116	137445	6001+54	X		37.8'					Remove Existing Pole
	137443	6001+68		X	56.6'					Remove Existing Pole
117	137428	6003+35	X		36.2'					Remove Existing Pole

AERIAL ROUTE 9 ALIGNMENT
Summary Continued:

Route 9 Connector Route 9 New Alignment WIN 18915.00

Versant Power
Versant Power will be redesigning the Route 9 corridor for the new alignment. This includes multiple new poles. Versant Power will be setting the poles, will frame and run new wire to these poles. Once all utility work is completed by all companies Versant Power will remove all old poles.

Charter Communications
Once Versant Power has completed their work Charter Communications will attach and splice their facilities to the new locations.

Consolidated Communications
Once Charter has completed their work Consolidated Communications will attach and splice their facilities to the new locations.

AERIAL ROUTE 9 CONNECTOR ROAD ALIGNMENT
Summary:

Versant Power has a 345 kV high tension transmission Line 390 collocated in the same utility easement with a Maine Electric Power Company (MEPCO) 345 kV high tension transmission Line 396 that cross the proposed Route 9 Connector Road between approximate STA 200+25 to 203+00. Versant Power also has a 115 kV transmission Line 66 that crosses the proposed Route 9 Connector Road at approximate STA 2070+50.

Versant Power and MEPCO will reconfigure and/or reconstruct their 345kV high tension transmission lines over the proposed Route 9 Connector Road between STA 200+25 to 203+00 using contractors they hire directly. MaineDOT contractors will not be involved with this work. Versant Power will manage the work for both the MEPCO Line 396 and Versant Line 390. Versant Power's current schedule for the Line 390 and Line 396 work will begin September 23, 2021 and run through the end of October or early November.

Versant Power will also reconfigure and/or reconstruct their 115 kV Line 66 using contractors they hire directly. MaineDOT contractors will not be involved with this work. Versant Power's current schedule for the Line 66 work is estimated to be complete between late 2022 and early 2023.

Versant Power shall complete the reconfiguration/reconstruction work for all transmission Lines 66, 390, and 396 in coordination with the Project's overall construction schedule, as outlined in the Project's contract documents. However, timing of construction for the large transmission 115 kV and 345 kV lines may be subject to approval and scheduling of regional system operators.

Town: **Brewer- Eddington**
Project: **18915.00**
Date: **July 27, 2021**

SUBSURFACE

Summary:

Utility	Summary of Work	Estimated Working Days
Versant Power	Under Ground Duct Bank	N/A
Charter Communications	Under Ground Duct Bank	N/A
Consolidated Communications	Under Ground Duct Bank	N/A
Bangor Water District	Private service disconnects	**5**
Brewer Water Department	Water Gate adjustment	**3**
Bangor Gas Company	Gas Gate adjustment	**2**
City of Brewer	Drainage Manhole Covers & Sewer Manholes	**4**
	Total:	**14**

Utility Specific Issues:

Brewer Water Department

The City of Brewer has entered into an agreement with the Maine Department of Transportation for the MaineDOT Contractor to construct 2 new water mains and all necessary structures at Eastern Ave and Levenseller Road. The existing water main must remain in operation during construction of the bridge project. It shall be the responsibility of the Contractor to construct a temporary water crossing/bypass for the existing water main that meets approval by Brewer Water Department.

Detailed plan and specifications can be found in the bid book package. The Brewer Water Department will be responsible for inspection and final acceptance of water work.

Brewer Water Department also have 3 water gate boxes located on route 1A. Mill and fill operation are planned for these locations. The utility will need 2 days to lower and 1 day to raise the gates for the operation. Paving contractor is responsible to set finish height during paving.

The Contractor will be responsible for the installation of an electrical service to be owned by the Brewer Water Department. (At Eastern Ave bridge crossing and Levenseller Road bridge crossing) Plans and specifications are contained in the contract book for the project.

In general, all 240-volt upgrade projects will require a new electric service account. For those upgrades and other projects that require new electric service accounts, the Contractor shall request that a new account be established by contacting the Brewer Water Department, for all locally owned facilities. **The contact to establish a new service account is Rodney Butler 207-989-4214.** The Contractor shall provide the following information with the new electric service account request:

- Electrician's name performing the work
- Voltage
- Amperage
- Pole number of the power supply
- Distance from the pole to the control box
- The number of the closest meter to the pole and utility.

The Contractor shall allow at least 4 weeks for the Brewer Water Department to establish the account. Details are contained within the contract bid book.

Lambert Road Utility Duct Bank

Versant Power:
Charter Communications:
Consolidated Communications:

Each of the utilities listed above have entered into an agreement with the Maine Department of Transportation to construct a concrete duct bank approximately 585 ft containing 5 conduits in total. Two 5-inch PVC conduits for Versant Power, Two 4-inch PVC conduits for Consolidated Communications and One 4-inch PVC conduit for Charter Communications. The duct bank is to be constructed by MaineDOT Contractor as per plan and specification provided within the contract bid book. The conduits must be clearly labeled at the ends of the conduits identifying the respective utility and pull cords installed. Each utility will be responsible to load and pull their own cables. It is the responsibility of each utility to inspect and except all work performed.

All riser pole materials and equipment needed to rise on the poles is to be supplied and installed by the respective utility using the pole.

Bangor Water District
Bangor Water District has 2 service facilities to homes the will need to be discontinued at the water main. Bangor Water will need five days to perform this work.

Bangor Gas Company
Bangor Gas Company has facilities within the project limits located at station 493+50 Lt to station 495+75 Lt. Excavation is planned for this location. Bangor Gas Company must be notified before any excavation is preformed. Bangor Gas Company will provide an inspector any time work is to take place in or around where gas is located. Test pits located the gas line to be at a depth of 4± feet. There also 2 gas shut off valve covers located on Route 1 A that will need to be adjusted down for the mill and fill pavement

operation. The covers will also need to be adjusted to finish grade. Paving contractor is responsible to set finish height during paving. Bangor gas requires 5 working days' notice prior to the work being done.

City of Brewer

The City of Brewer has 5 sewer manholes located on Route 1A. The manholes will need to be adjusted down for the mill and fill pavement operation. The City requires 5 working days' notice prior to the work being done. Paving contractor is responsible to set finish height during paving.

Brewer Water Department

The Brewer Water Department has 4 water gate boxes will need to be adjusted down for the mill and fill pavement operation located on Route 1A. The Brewer Water Department requires 5 working days' notice prior to the work being done. paving contractor is responsible to set finish height during paving.

All underground utilities require **3 working days' notice** for any/all excavation or any other subsurface work around any underground facilities to schedule an on-site representative to be present. The Contractor shall hand dig around all the underground facilities.

Utilities may have underground service facilities located within the project limits. Underground service transfers have been included in the aerial working days estimates. No impacts are anticipated to their service facilities.

RAILROAD

Maine DOT Railroad

No Railroad conflicts are anticipated within the scope of work planned for this project. Should any arise the Railroad must be contacted as soon as possible.

MAINTAINING UTILITY LOCATION MARKINGS

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

UTILITY SIGNING

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

SPECIAL PROVISION
SECTION 104
General Rights and Responsibilities
(Reserved Limits)

For WIN 18915.00

- Parcel Number 21 Foss and Parcel Number 24 Arbo, shall be reserved. No work shall take place in or within 50 feet of the dwellings on these properties until after February 28, 2022, or unless prior released by the Department.

December 17, 2010
Supersedes December 30, 2009

SPECIAL PROVISION
SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES
(Electronic Payroll Submission)
(Payment Tracking)

104.3.8.1 Electronic Payroll Submission The prime contractor and all subcontractors and lower-tier subcontractors will submit their certified payrolls electronically on this contract utilizing the Elation System web based reporting. There is no charge to the contracting community for the use of this service. The submission of paper payrolls will not be allowed or accepted. Additional information can be found at http://www.maine.gov/mdot/contractors/ under the first "Notice".

104.3.8.2 Payment Tracking The prime contractor and all subcontractors and lower-tier subcontractors will track and confirm the delivery and receipt of all payments through the Elation System

Brewer-
Eddington
18915.00
June 10, 2020

SPECIAL PROVISION
SECTION 105
General Scope of Work
(Contract Supplied Equipment)

Replace the following Standard Specification:

105.6.2.4 Department Verification The Contractor shall furnish **X** Global Navigation Satellite System (GNSS) or Global Positioning System (GPS) Rovers and/or Robotic Total Stations (RTS) equipment to the Department with the same capabilities as those used by the Contractor or other approved method, such as reference staking, to allow the Department to independently verify the accuracy of the work, as approved by the Department.

This equipment referred to above shall be compatible with the system(s) used by the Contractor and be provided to the Project Resident prior to the Contractor commences Work using electronic layout methods. This equipment shall stay in the possession of the Department for the duration of the project and shall be returned, in good condition, to the Contractor upon final acceptance of the field work. Any augmented features (such as laser refinement) used by the Contractor shall be included in the features available on the equipment provided to the Department.

The Contractor shall provide manufacturer-certified training on the use of the GNSS, GPS, and/or RTS equipment and the Contractor's systems to Department project personnel prior to beginning any Work. This training is for the purpose of providing Department project personnel with an understanding of the equipment, software, and electronic data being used by the Contractor.

SPECIAL PROVISION
SECTION 105
GENERAL SCOPE OF WORK
(LIMITATIONS OF OPERATIONS)

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

2. The Contractor shall provide the Resident with a 48-hour written notice before beginning night work.

3. For Route 1A: The Contractor shall maintain one 11-foot wide lane, minimum, in each direction, expect complete closures are allowed between the hours of 9 pm and 6 am for 15 minutes at a time.

4. All Ramps may have night closures between the hours of 7pm and 6am

    a. Ramp E must be open to traffic with at least base pavement completed prior to any ramp closures.
    b. Ramp closures require Resident approval and a minimum of 72-hour notice
    c. The Jug Handle (Station 5000+00) shall be open to traffic with at least base pavement prior to any Ramp closures.

5. Bridge construction limitations:
    a. Eastern Avenue, Clewleyville Road, and Levenseller Road may be closed on 3/15 through 11/15 of any year. Each road shall only be closed for one construction season and open to traffic as defined below by the end of the closure.
    b. Clewleyville Road and Levenseller Road shall not be closed at the same time
    c. For Lambert Road under Lambert Bridge: The Contractor must maintain one 11' wide lane of alternating traffic at all times, except night closures will be allowed.
    d. Eastern Avenue, Clewleyville Road, and Levenseller Road bridges will be considered open to traffic when two lanes of two-way traffic are maintained and the following items are complete, in place, inspected and accepted: bridge rail, approach rail, approach base pavement, and approach guardrail. Outside of the complete bridge closure, the bridge will be open to two-way traffic except alternating one-way traffic may be used during working hours.
    e. Supplemental Liquidated Damages in the amount of $1000/per Calendar Day will be assessed for each calendar day that each bridge is not open to traffic as defined in 5 d.

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

Tree clearing consists of vegetation clearing within the areas denoted by "CLL" in the plans, and any clearing associated with gravel or fill extraction for the Project that is located more than 300 feet outside the Project ROW in either direction, or outside a 0.5 mile radius from the Project Interchanges. To minimize effects to the Federal Threatened species Northern long-eared bat (NLEB), this project includes a time of year restriction for tree clearing and structure removal.

I. Tree clearing shall not be allowed between the dates of April 21 and October 14.
Tree clearing is allowed between the dates of October 15 and April 20)

II. Tree removal for temporary work areas will be minimized to the greatest extents practicable.

III. All trees greater than 3" diameter at breast height and all structures are considered suitable roost habitat for NLEB.
   a. All suitable roost habitat for NLEB shall be removed between the dates of October 15 and April 20.
   b. The contractor shall coordinate with MaineDOT Environmental Office for confirmation if structure removal during this period is not feasible.

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

Work within stream ("In Stream Work," see MaineDOT Standard Specifications 101.2 Definitions) requires special conditions to minimize impacts. The following special conditions shall apply to this project:

I. In Stream Work applies to the following bridge and culvert locations:
1. Felts Brook at Station 55+08 and 904+60 (Ramp D)
2. Tributary to Felts Brook at Station 64+14
3. Tributary to Felts Brook at Station 66+73
4. Tributary to Eaton Brook at Station 133+85
5. Eaton Brook at Station 140+90
6. Tributary to Eaton Brook at Station 273+50
7. Tributary to Eaton Brook at Station 298+49

II. Instream construction including placement and removal of cofferdams shall occur between July 15 and October 1, this is an In Stream Work Window. Any instream construction activity that cannot be completed prior to October 1 requires a bypass channel be constructed to allow Atlantic salmon movement. All bypass channels shall be constructed and operating by October 2. The In Stream Work Window or bypass channel requirement applies to the following In Stream Work locations:
1. Felts Brook at Station 55+08 and 904+60 (Ramp D)
2. Tributary to Felts Brook at Station 64+14
3. Tributary to Felts Brook at Station 66+73
4. Eaton Brook at Station 140+90

III. The contractor shall hold a pre-construction meeting with appropriate MaineDOT Environmental Office staff, other MaineDOT staff, and the Contractor(s) to review all procedures and requirements for avoiding and minimizing effects to the Federal Endangered Species Atlantic salmon (ATS). The following individuals/agencies shall be invited: FHWA (Federal Highway Administration, Eva Birk, eva.birk@dot.gov), ACOE (Army Corps of Engineers, Jay Clement, jay.l.clement@usace.army.mil), USFWS (U.S. Fish and Wildlife Service, Patrick Dockens, patrick_dockens@fws.gov and Nicole Pauley nicole_pauley@fws.gov).

IV. To minimize the effects to the Federal Endangered Species Atlantic salmon (ATS), the following Special Conditions apply to the In-Stream Work Locations (Section II):
1. Migration/movement barrier/delay due to cofferdam placement will be minimized by limiting cofferdam placement to the time necessary to complete the instream activities. The cofferdams shall be removed within 2 days of the completion of in stream construction.
2. The Contractor shall submit a stream bypass channel plan to the Resident by September 1 of any year for review and approval for in stream construction activity that cannot be completed prior to October 1.
3. The Contractor shall place coarse woody debris to the relocated portion of Felts Brook at the direction of MaineDOT Environmental Office staff.
4. The following Special Conditions apply to any pile driving activities which may occur within ATS Critical Habitat Streams (Locations in Section II):

a. The contractor shall employ a bubble curtain for any in-water **impact** pile driving. The bubble curtain shall meet design specifications and performance requirements in the attached Bubble Curtain Specification.
b. Hydroacoustic monitoring for all pile driving (impact and vibratory) shall be completed as follows for a subset of in-water work locations either upstream or downstream of the project where there is more than 1.3 feet of water present. MaineDOT will provide monitoring reports to the US Fish and Wildlife Service.
c. The Contractor shall retain the services of a qualified person or firm to prepare and implement a hydroacoustic monitoring plan following the attached "Underwater Noise Monitoring Plan" template. The Contractor shall provide MaineDOT a completed draft hydroacoustic monitoring plan at least 45 days prior to implementation for review. No in-stream noise-generating activities may commence until MaineDOT has approved the monitoring plan.
d. The Contractor shall provide Hydroacoustic monitoring data to MaineDOT. Preliminary data shall be reported to MaineDOT within 5 business days of pile driving activity. A final summary report of all data must be submitted within 2 months of completion of in-water construction.
e. The Contractor shall be responsible for implementing noise monitoring and noise attenuation as described above. Payment shall be made as an item incidental to the cofferdam.

5. The Contractor shall contact the Eric Ham of MaineDOT Environmental Office (207-215-7356) at least 2 weeks prior to the installation of cofferdams to coordinate fish evacuation. Fish evacuation includes electrofishing. Electrofishing activities are prohibited when water temperature is greater than or equal to 22 degrees Celsius (71.6 degrees Fahrenheit).
6. When utilizing pumps to dewater cofferdam the Contractor will use a screen on each pump intake designed such that the approach velocity does not exceed 0.20 feet/second. Square or round screen face openings are not to exceed 3/32 inches (2.38 millimeters) measured on a diagonal. Criteria for slotted face openings shall not exceed 1/16 inches (approximately 1.75 millimeters) in the narrow direction. These screen criteria follow National Marine Fisheries Service (NMFS) guidance (NMFS 2008). Intake hoses shall be regularly monitored while pumping to minimize adverse effects to Atlantic salmon or other species.
7. All Atlantic salmon mortalities from electrofishing or any other project related activities shall be reported to the MaineDOT Environmental Office (Eric Ham, 207-215-7356 or Ryan Annis) immediately.
8. Heavy machinery used for installation of rip rap and other materials shall be operated from the stream banks or road side slopes, or outside the wetted perimeter where practicable; unless within a dewatered cofferdam.
9. Temporary roads within 150 feet of streams shall avoid, minimize and mitigate soil disturbance and compaction by clearing vegetation to ground level, placing clean gravel over geotextile fabric. No grubbing shall occur outside areas to be permanently altered. Existing roads and trails shall be used to the greatest extents practicable.
10. All rip rap placed outside of a cofferdam shall be cleaned prior to installation.

V. Special Conditions which apply to all locations of In-Stream Work (Section I):

1. All In-Stream Work shall occur within a cofferdam.
2. No construction equipment shall be operated below the high-water mark of any stream outside of a cofferdam.

3. To prevent entrainment of fish related to water diversion, screening with square or round face screen openings not to exceed ½ inch on a diagonal shall be used on all pump intakes for the duration of In Stream Work
4. Suspended sediment treatment shall follow the procedures described in Attachment 1 "Dirty Water Treatment System."
5. To minimize the spread of noxious weeds into the riparian zone, all off-road equipment and vehicles, operating also on existing open and maintained roads, shall be clear of soil, seed, vegetation, or other debris prior to entering the construction site. The Contractor shall clean and inspect all equipment immediately prior to being received at the construction site.
6. Construction impacts shall be confined to the minimum area necessary to complete the project.
7. Temporary access roads and staging areas shall comply with all conservation measures and applicable SEWPCP BMPs.
8. Vegetation shall be grubbed only from those areas subject to permanent alteration.
9. All disturbed areas that retain pervious soil conditions (e.g., temporary staging areas and access roads), shall be restored to pre-construction conditions and replanted for permanent soil stabilization.
10. Temporary fill storage piles shall be located within upland areas not subject to flooding during the rainy season (March – July) or when flooding is likely or probable at the time of placement unless approved by the Resident. All fill material storage piles shall be appropriately stabilized to prevent erosion and sedimentation.
11. All concrete shall be poured in the dry or within confined waters not being dewatered to surface waters. Prior to release to a natural resource, any impounded water that has been in contact with concrete placed during construction shall be tested to have a pH between 6.0 and 8.5, shall be within one pH unit of the receiving water pH level, and shall have a turbidity level no greater than the receiving resource. This condition applies to concrete that is placed or spilled (including leaking forms), as well as direct contact from tools or equipment.

VI. Special Conditions:
1. Special conditions of the U.S. Army Corps of Engineers (Corps) Individual Permit # NAE-2017-02746 shall apply to this project (permit is pending, draft conditions summarized in this SP 105 In Stream work and SP 105 Environmental Requirements).
2. Special Conditions of the Maine Department of Environmental Protection Individual Permit L-28978 shall apply to this project (see permit and conditions in contract documents).
3. Commitments from US Fish and Wildlife Service Section 7 Consultation (Summarized in this SP 105 – In Stream Work, SP 105 – Tree Clearing Restrictions, and SP 105 – Environmental Requirements).

VII. Approvals for In-Stream Work:
1. Temporary Soil Erosion and Water Pollution Control Plan (SEWPCP)
2. U.S. Fish & Wildlife Service Biological Opinions
3. Maine Department of Environmental Protection approved order # L-28978
4. Army Corps of Engineers Individual Permit: NAE-2004-02746 *pending*
    a. Authorized stream (RUS) fill:

	Permanent	**Temporary**
Stream (RUS)	0.5 acres	0.1 acres

    b. Stream (RUS) fill authorized by this permit may not be placed until pending permit is received from ACOE and the Resident confirms work in these resources may begin.

VIII. No work shall be allowed that completely blocks a river, stream, or brook without providing downstream flow.

NOTE: Temporary access and permits for temporary roads and stream crossings outside the ROW is the sole responsibility of the Contractor.

SPECIAL PROVISION SECTION 105
GENERAL SCOPE OF WORK
(Environmental Requirements)

Work within wetlands require permits and special conditions to minimize impacts. Wetlands are defined as: Areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. The following special conditions shall apply to the locations shown in the Corps permit #NAE-2004-02472:

I. Special conditions related to temporary wetland fill:
   A. Temporary fill storage piles shall be located within upland areas not subject to flooding during the rainy season (March – July) or when flooding is likely or probable at the time of placement unless approved by the Resident. All .
   B. All temporarily disturbed areas created from construction activities shall be revegetated following MaineDOT BMPs for Erosion and Sedimentation Control. Permanent revegetation shall occur after sections are completed and shall be done in compliance with Standard Specification 618 Seeding and with Standard Specification 621 Landscaping.
   C. Temporary access roads and staging areas shall comply with all conservation measures and applicable SEWPCP BMPs.
   D. Vegetation shall be grubbed from areas undergoing permanent alteration.
   E. All disturbed areas that retain pervious soil conditions (e.g., temporary staging areas and access roads) shall be restored to pre-construction conditions and replanted for permanent soil stabilization.
   F. Existing roads shall be used to the greatest extents practicable.

II. Special conditions related to minimizing the spread of invasive species:
   A. To minimize the spread of invasive species, straw mulch shall be utilized in disturbed wetland areas for soil stabilization (hay mulch may be utilized in other areas).
   B. Prior to being on site, the Contractor shall inspect and remove seeds, plant material, soil, mud, insects, and other invertebrates on all equipment; including construction mats, to be used on the project site. At a minimum the following shall be inspected and cleaned on terrestrial vehicles where applicable: vehicle tires, vehicle tracks, vehicle interiors.

III. Construction impacts shall be confined to the minimum area necessary to complete the project.
   A. The project limits shall be visually marked using flagging or signage prior to clearing activities. Clearing beyond these limits is not allowed and shall follow the provisions of SP105 – Tree clearing restrictions.

IV. Approvals:

A. Soil Erosion and Water Pollution Control Plan (SEWPCP)
B. Maine Department of Environmental Protection Individual Permit #L-28978
C. Army Corps of Engineers Individual Permit: NAE-2004-02472 *pending*
    1. Authorized wetland fill:
        a) Permanent: 1,016,316 SF (23.3 acres)
        b) Temporary: 602,810 SF (13.8 acres)
    2. Wetland fill authorized by this permit may not be placed until pending permit is received from ACOE and the Resident confirms work in these resources may begin.

SPECIAL PROVISION 105
GENERAL SCOPE OF WORK
Equal Opportunity and Civil Rights
(Disadvantaged Business Enterprises Program)

105.10.1.1 Disadvantaged Business Enterprises Program The Maine Department of Transportation (MaineDOT) has established a Disadvantaged Business Enterprise (DBE) program in accordance with regulations of the United States Department of Transportation (USDOT), 49 CFR Part 26. The MaineDOT receives federal financial assistance from USDOT, and as a condition of receiving this assistance, the Department has signed an assurance that it will comply with 49 CFR Part 26.The MaineDOT is responsible for determining the eligibility of and certifying DBE firms in Maine.

A DBE is defined as a for-profit business that is owned and controlled by one or more socially and economically disadvantaged person(s). For the purpose of this definition:

1. "Socially and economically disadvantaged person" means an individual who is a citizen or lawful permanent resident of the United States and who is Black, Hispanic, Native American, Asian, Female; or a member of another group or an individual found to be disadvantaged by the Small Business Administration pursuant to Section 3 of the Small Business Act.
2. "Owned and controlled" means a business which is:
    a. A sole proprietorship legitimately owned and controlled by an individual who is a disadvantaged person.
    b. A partnership or limited liability company in which at least 51% of the beneficial ownership interests legitimately are held by a disadvantaged person(s).
    c. A corporation or other entity in which at least 51% of the voting interest and 51% of the beneficial ownership interests legitimately are held by a disadvantaged person(s).

The disadvantaged group owner(s) or stockholder(s) must possess control over management, interest in capital, and interest in earnings commensurate with the percentage of ownership. If the disadvantaged group ownership interests are real, substantial and continuing and not created solely to meet the requirements of this program, a firm is considered a bona fide DBE.

105.10.1.2 Commercially Useful Function MaineDOT will count expenditures of a DBE contractor toward DBE goals only if the DBE is performing a commercially useful function on that contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. Credit will only be given when the DBE meets all conditions for a CUF. Credit for labor will be in accordance with the responsibilities outlined in the contract. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the materials, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, MaineDOT will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and DBE credit claimed for its performance of the work, and other relevant factors.

Rented equipment used by the DBE must not be rented from the Prime Contractor on a job that the DBE is subcontracted with that Prime Contractor for regular course of business.

A current listing of certified DBEs that may wish to participate in the highway construction program and the scope of work for which they are certified can be found at http://www.maine.gov/mdot/disadvantaged-business-enterprises/pdf/directory.pdf. Credit will be given for the value described by a DBE performing as:

A. A prime contractor; 100% of actual value of work performed by own workforces.
B. An approved subcontractor; 100% of work performed by own workforces.
C. An owner-operator of construction equipment; 100% of expenditures committed.
D. A manufacturer; 100% of expenditures committed. The manufacturer must be a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor. Brokers and packagers shall not be regarded as manufacturers.
E. A regular dealer; 60% of expenditures committed. A regular dealer is defined as a firm that owns, operates, or maintains a store, warehouse or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public. For purposes of this provision a "Broker" is a DBE that has entered into a legally binding relationship to provide goods or services delivered or performed by a third party. Brokers and packagers shall not be regarded as regular dealers.
F. A bona fide service provider; 100% of reasonable fees or commissions. Eligible services include professional, technical, consultant, or managerial, services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for the performance of the contract. Eligible services also include agencies providing bonding and insurance specifically required for the performance of the contract.
G. A trucking, hauling or delivery operation. 100% of expenditures committed when trucks are owned, operated, licensed and insured by the DBE and used on the contract and, if applicable, includes the cost of the self supplied materials and supplies.100% of expenditures committed when the DBE leases trucks from another DBE firm including an owner-operator. 100% of reasonable fees or commissions the DBE receives as a result of a lease arrangement for trucks from a non-DBE, including an owner-operator.
H. Any combination of the above.

105.10.1.3 Race-neutral Goals The Maine DOT is required to set an annual goal (approved on a three year basis) for DBE participation in Federal-aid projects. In order to fulfill that goal, bidders are encouraged to utilize DBE businesses certified by the MaineDOT. MaineDOT seeks to meet the established DBE goal solely through race-neutral means. *Race-neutral* DBE participation occurs when a DBE is awarded a prime contract through customary competitive procurement procedures, is awarded a subcontract on a contract that does not carry a DBE contract goal, or wins a subcontract from a prime contractor that did not consider its DBE status in making the award. A DBE/subcontractor Utilization Proposed Form is required to be included in bid documents.

MaineDOT will analyze each project and create a Project Availability Target (PAT), based on a number of factors including project scope, available DBE firms, firms certified in particular project work, etc. Each bid will request that the contractor attempt to meet the PAT. This PAT is developed to assist contractors to better understand what the MaineDOT expectations are for a

specific project. The PAT is NOT a mandate but an assessment of what this particular project can bear for DBE participation. The Department anticipates that each contractor will make the best effort to reach or exceed this PAT for the project.

105.10.1.4 Race-conscious Project Goals If it is determined by the Department that the annual DBE goal will not be met through *race-neutral* means, the Department may implement *race-conscious contract goals* on some projects. Race-conscious contract goals are goals that are enforceable by the Department and require that the prime contractor use good faith effort to achieve the goal set by the Department for that particular project. If race conscious means are implemented on a project, the Prime must comply with the requirements of 49 CFR.

At the time of the bid opening, all Bidders shall submit with their bid a Disadvantaged Business Enterprise (DBE) Commitment Form provided by the Department. This form will list the DBE and non-DBE firms that are proposed to be used during the execution of the Work. The list shall show the name of the firm, the item/material/type of work involved and the dollar amount of work to be performed. The dollar total of each commitment shall be totaled and a percentage determined.

If the project goal is not met, acceptable documentation showing all good faith efforts made to obtain participation may be required in order to award the project. Failure to provide the required listing with the dollar participation total or acceptable documentation of good faith efforts to obtain DBE participation within 3 days after the bid opening date will be considered a lack of responsiveness on the part of the low bidder. Rejection of the low bid under these circumstances will require the low bidder to surrender the Proposal Guaranty to the Department. The submission and approval of the above forms does not constitute a formal subcontract.

If for any reason during the progress of the Work the Contractor finds that DBEs included on the list are unable to perform the proposed work, the Contractor, with written release by the committed DBE or approval of the Department, may substitute other DBE firms for those named on the list. If the Contractor is able to clearly document their inability to find qualified substitute firms to meet the project goal, the Contractor may request in writing approval to substitute the DBE with a non-DBE firm. If at any time during the life of the Contract it is determined that the Contractor is not fulfilling the goal or commitment(s) and is not making a good faith effort to fulfill the DBE requirement, the Department may withhold progress payments. If good faith effort is determined by the Department, failure to meet the DBE contract goal will not be a detriment to the bid award. Fulfillment of the goal percentage shall be determined by dividing the dollars committed to the DBEs by the actual contract dollars. These requirements are in addition to all other Equal Employment Opportunity requirements on Federal-aid contracts.

105.10.1.5 Certification of DBE attainment on Contracts The MaineDOT must certify that it has conducted post-award monitoring of all contracts to ensure that DBEs had done the work for which credit was claimed. The certification is for the purpose of ensuring accountability for monitoring which the regulation already requires. The MaineDOT will certify these contracts through review of CUF forms, Elations sub-contract payment tracking as well as occasional on-site reviews of projects and through the project's final closeout documentation provided by our Contracts Section.

105.10.1.6 Bidders' List Survey Pursuant to 49 CFR 26.11 the MaineDOT is required to "create and maintain" a bidders list and gather bidder information on our construction/consultant projects, Contractors will maintain information on all subcontract bids submitted by DBE and Non-DBE firms and provide that information to the Department. The Following information is required:

Firm Name
Firm Address
Firm status (DBE or non-DBE)
Age of firm (years)
And the annual gross receipts amount as indicated by defined brackets, i.e. $500,000 to $800,000, rather than requesting exact figures.

Not only is this information critical in determining the availability of DBE businesses relative to other businesses that do similar work, but the Federal Highway Administration requires that we obtain this information.

MaineDOT DBE Project Attainment Target (PAT)
for this Project is 7%

The MaineDOT seeks to meet the specified annual Disadvantaged Business Enterprise (DBE) usage goal set out by 49 CFR 26.45 through the efforts of contractors seeking to employ qualified DBE subcontractors. We seek to meet this goal by race neutral means and do not, at this time, use contract specific requirements for each project. We do however, understand the capacity of Maine's DBE community and the unique characteristics a project may have that would differ from the broad annual goal.

Taking this into consideration, the MaineDOT will review each project and develop an anticipated attainment or Project Attainment Target (PAT) based on several factors that are project specific. Those factors include:

- ☐ Scope of Work
- ☐ DBE availability according to Specification Item
- ☐ Geographic location
- ☐ DBE capacity

This PAT is developed to assist contractors to better understand the DBE participation that the MaineDOT can reasonably expect for a specific project. The PAT is NOT a mandate but an assessment of the DBE opportunities that this project could meet or exceed. MaineDOT anticipates that each contractor will make the best effort to reach or exceed the PAT for this project.

SPECIAL PROVISION 105
OVERLIMIT PERMITS

Title 29-A § 2382 MRSA Overlimit Movement Permits.

1. Overlimit movement permits issued by State. The Secretary of State, acting under guidelines and advice of the Commissioner of Transportation, may grant permits to move nondivisible objects having a length, width, height or weight greater than specified in this Title over a way or bridge maintained by the Department of Transportation

2. Permit fee. The Secretary of State, with the advice of the Commissioner of Transportation, may set the fee for single trip permits, at not less than $6, nor more than $30, based on weight, height, length and width. The Secretary of State may, by rule, implement fees that have been set by the Commissioner of Transportation for multiple trip, long-term overweight movement permits. Rules established pursuant to this section are routine technical rules pursuant to Title 5, chapter 375, subchapter II-A.

3. County and municipal permits. A county commissioner or municipal officer may grant a permit, for a reasonable fee, for travel over a way or bridge maintained by that county or municipality

4. Permits for weight. A vehicle granted a permit for excess weight must first be registered for the maximum gross vehicle weight allowed for that vehicle.

5. Special mobile equipment. The Secretary of State may grant a permit, for no more than one year, to move pneumatic-tire equipment under its own power, including Class A and Class B special mobile equipment, over ways and bridges maintained by the Department of Transportation. The fee for that permit is $15 for each 30-day period.

6. Scope of permit. A permit is limited to the particular vehicle or object to be moved, the trailer or semitrailer hauling the overlimit object and particular ways and bridges.

7. Construction permits. A permit for a stated period of time may be issued for loads and equipment employed on public way construction projects, United States Government projects or construction of private ways, when within construction areas established by the Department of Transportation. The permit:

A. Must be procured from the municipal officers for a construction area within that municipality;

B. May require the contractor to be responsible for damage to ways used in the construction areas and may provide for:

(1) Withholding by the agency contracting the work of final payment under contract; or

(2) The furnishing of a bond by the contractor to guarantee suitable repair or payment of damages.

The suitability of repairs or the amount of damage is to be determined by the Department of Transportation on state-maintained ways and bridges, otherwise by the municipal officers;

C. May be granted by the Department of Transportation or by the state engineer in charge of the construction contract; and

D. For construction areas, carries no fee and does not come within the scope of this section.

8. Gross vehicle weight permits. The following may grant permits to operate a vehicle having a gross vehicle weight exceeding the prescribed limit:

A. The Secretary of State, with the consent of the Department of Transportation, for state and state aid highways and bridges within city or compact village limits;

B. Municipal officers, for all other ways and bridges within that city and compact village limits; and

C. The county commissioners, for county roads and bridges located in unorganized territory.

9. Pilot vehicles. The following restrictions apply to pilot vehicles.

A. Pilot vehicles required by a permit must be equipped with warning lights and signs as required by the Secretary of State with the advice of the Department of Transportation.

B. Warning lights may be operated and lettering on the signs may be visible on a pilot vehicle only while it is escorting a vehicle with a permit on a public way.

With the advice of the Commissioner of Transportation and the Chief of the State Police, the Secretary of State shall establish rules for the operation of pilot vehicles.

9-A. Police escort. A person may not operate a single vehicle or a combination of vehicles of 125 feet or more in length or 16 feet or more in width on a public way unless the vehicle or combination of vehicles is accompanied by a police escort. The Secretary of State, with the advice of the Commissioner of Transportation, may require a police escort for vehicles of lesser dimensions.

A. The Bureau of State Police shall establish a fee for state police escorts to defray the costs of providing a police escort. A county sheriff or municipal police department may establish a fee to defray the costs of providing police escorts.

B. The Bureau of State Police shall provide a police escort if a request is made by a permittee. A county sheriff or municipal police department may refuse a permittee's request for a police escort.

C. A vehicle or combination of vehicles for which a police escort is required must be accompanied by a state police escort when operating on the interstate highway system.

10. Taxes paid. A permit for a mobile home may not be granted unless the applicant provides reasonable assurance that all property taxes, sewage disposal charges and drain and sewer assessments applicable to the mobile home, including those for the current tax year, have been paid or that the mobile home is exempt from those taxes. A municipality may waive the requirement that those taxes be paid before the issuance of a permit if the mobile home is to be moved from one location in the municipality to another location in the same municipality for purposes not related to the sale of the mobile home.

11. Violation. A person who moves an object over the public way in violation of this section commits a traffic infraction.

Section History:
PL 1993, Ch. 683, §A2 (NEW).
PL 1993, Ch. 683, §B5 (AFF).
PL 1997, Ch. 144, §1,2 (AMD).
PL 1999, Ch. 117, §2 (AMD).
PL 1999, Ch. 125, §1 (AMD).
PL 1999, Ch. 580, §13 (AMD).
PL 2001, Ch. 671, §30 (AMD).
PL 2003, Ch. 166, §13 (AMD).
PL 2003, Ch. 452, §Q73,74 (AMD).
PL 2003, Ch. 452, §X2 (AFF).

SPECIAL PROVISION 105
CONSTRUCTION AREA

A Construction Area located in the **City/Town of Brewer - Eddington** has been established by the Maine Department of Transportation (MDOT) in accordance with provisions of 29-A § 2382 Maine Revised Statutes Annotated (MRSA).

(a) The section of highway under construction beginning at Sta. 25+00.00 and ending at Sta. 343+00.00 of the new construction centerline plus approaches.

Per 29-A § 2382 (7) MRSA, the MDOT may "*issue permits for stated periods of time for loads and equipment employed on public way construction projects, United States Government projects or construction of private ways, when within construction areas established by the Department of Transportation. The permit:*

A. Must be procured from the municipal officers for a construction area within that municipality;

B. May require the contractor to be responsible for damage to ways used in the construction areas and may provide for:

(1) Withholding by the agency contracting the work of final payment under contract; or

(2) The furnishing of a bond by the contractor to guarantee suitable repair or payment of damages.

The suitability of repairs or the amount of damage is to be determined by the Department of Transportation on state-maintained ways and bridges, otherwise by the municipal officers;

C. May be granted by the Department of Transportation or by the state engineer in charge of the construction contract; and

D. For construction areas, carries no fee and does not come within the scope of this section."

The Municipal Officers for the **City/ Town of Brewer - Eddington** agreed that an Overlimit Permit will be issued to the Contractor for the purpose of using loads and equipment on municipal ways in excess of the limits as specified in 29-A MRSA, on the municipal ways as described in the "Construction Area".

As noted above, a bond may be required by the municipality, the exact amount of said bond to be determined prior to use of any municipal way. The MDOT will assist in determining the bond amount if requested by the municipality.

The maximum speed limits for trucks on any town way will be 25 mph (40 km per hour) unless a higher legal limit is specifically agreed upon in writing by the Municipal Officers concerned.

December 5, 2011
Supersedes December 1, 2010

SPECIAL PROVISION
SECTION 105
GENERAL SCOPE OF WORK
(Buy America Certification)

105.11 Federal Requirements Add the following as the third and subsequent paragraphs:

"Prior to payment by the Department, the Contractor shall provide a certification from the producer of steel or iron, or any product containing steel or iron as a component, stating that all steel or iron furnished or incorporated into the furnished product was manufactured in the United States in accordance with the requirements of the Buy America provisions of 23 CFR 635.410, as amended. Such certification shall also include (1) a statement that the iron or steel product or component was produced entirely within the United States, or (2) a statement that the iron or steel product or component was produced within the United States except for minimal quantities of foreign steel and iron valued at $ (actual value).

All manufacturing processes must take place domestically. Manufacturing begins with the initial melting and mixing, and continues through the coating stage. Any process which modifies the chemical content, the physical size and shape, or the final finish is considered a manufacturing process. These processes include rolling, extruding, machining, bending, grinding, drilling, and coating. "Coating" includes epoxy coating, galvanizing, painting, or any other coating that protects or enhances the value of the material.

A Buy America Certification is required from each manufacturer, fabricator, supplier, subcontractor, etc. that meets the "manufacturing" definition above.

Buy America does not apply to raw materials (iron ore and alloys), scrap, pig iron, or processed, pelletized, and reduced iron ore."

SPECIAL PROVISION
SECTION 106
QUALITY

106.6 Acceptance

Revise this Subsection by replacing the first two paragraphs with:

"**106.6 Acceptance The Department is responsible for determining the acceptability of the Work. Acceptance of the Material is based on the visual inspection of the construction, monitoring of the Contractor's QCP, and Acceptance Test results. Acceptance sampling and testing is the responsibility of the Department (unless alternate procedures are specified) except for furnishing facilities, testing equipment, transportation, and Material samples as required.**

Acceptance of Hot Mix Asphalt Pavement will be based on Method A or C Statistical Acceptance, or Method B or D Acceptance as specified. The method of acceptance for each item is defined in Special Provision, Section 403, Hot Mix Asphalt Pavement. When items of Hot Mix Asphalt Pavement are not so designated, Method A will be utilized whenever there are more than 1000 tons per Hot Mix Asphalt Pavement item, and Method B will be utilized when there are less than or equal to 1000 tons per Hot Mix Asphalt Pavement item."

Revise Subsection "B" by replacing it with:

"B. Items not designated for Statistical Acceptance will utilize Method B or D Acceptance testing to validate the quality of the material incorporated into the Project. For material paid under Item 403.209 – Method D, or designated to be visually accepted, the Contractor shall provide the Department with a Certification Letter that indicates that the material supplied complies with the Specifications. Test results representative of the certified material shall be attached to the letter.

The Department will randomly sample and test the certified Material for properties noted in Table 1 of Section 502 - Structural Concrete or Table 14 of Section –401.21 Acceptance Method B & D. Material will be subject to rejection as noted in Structural Concrete Section 502.195 - Quality Assurance Method C Concrete or Hot Mix Asphalt, Section 401.2022 Pay Adjustment – Method B & D."

106.7.1 Standard Deviation Method Revise 106.7.1, subsection H by removing the following from the first paragraph:

"Method B: PF = [70 + (Quality Level * 0.33)] * 0.01"

Special Provision
Section 107
Time
(Supplemental Liquidated Damages for Fabrication Time)

107.8.1 Fabrication Time The Department has budgeted for the following amounts of continuous full time fabrication/shop QA inspection for the following Work components:

Element	Time	Supplemental LD
Bridge #6645		
Structural Plate Girders	42 Calendar Days	$1,000 per Calendar Day
Thermal Spray Coating	28 Calendar Days	$1,000 per Calendar Day
Bridge #6649		
Structural Plate Girders	42 Calendar Days	$1,000 per Calendar Day
Thermal Spray Coating	28 Calendar Days	$1,000 per Calendar Day
Bridge #6648		
Structural Plate Girders	49 Calendar Days	$1,000 per Calendar Day
Thermal Spray Coating	28 Calendar Days	$1,000 per Calendar Day
Bridge #6647		
Structural Plate Girders	49 Calendar Days	$1,000 per Calendar Day
Thermal Spray Coating	28 Calendar Days	$1,000 per Calendar Day
Precast MSE Panels	105 Calendar Days	$1,000 per Calendar Day
Bridge #6646		
Structural Plate Girders	49 Calendar Days	$1,000 per Calendar Day
Thermal Spray Coating	28 Calendar Days	$1,000 per Calendar Day

The Contractor is responsible for requiring their fabricators and suppliers to produce these products for the Work continuously until finished, including any needed actions to correct unacceptable workmanship or materials. If the Department determines that QA inspection beyond these times is required, then the corresponding Supplemental Liquidated Damages will be deducted as they occur from the amounts otherwise due to the Contractor. These allowed Fabrication Times begin on the first day of fabrication and runs consecutively until expiration for the work component listed.

If a fabricator or supplier works more than one shift per day and the Department determines that inspection is required for each shift, each shift will count as a calendar day and the LD rate will be the noted amount per shift per Calendar Day in lieu of per Calendar Day.

QA inspector presence is required but not limited to the following activities:

> For metal fabrication work: welding, including tack welding, heat correcting, non-destructive examination, assembly verification, and hold points in the approved Thermal Spray Coating procedure and any other times as required in the Standard Specifications or Special Provisions.

For concrete fabrication work: materials verification, verification of reinforcing, batching and casting of concrete, breaking of test cylinders, repairs, finishing fascia surfaces and any other times required in the 534 and 712.061 Standard Specifications.

SPECIAL PROVISION
SECTION 107
Prosecution and Progress
(Contract Time)

1. The Contractor shall complete all work on or before July 18, 2025.

2. The Contractor shall stop all work and have all lanes of Route 1A and associated Ramps open and in safe operating condition to traffic on the following dates: (Work will still be allowed on the connector and other roadways)

    a. Memorial Day, work shall cease on the Friday before the holiday and may resume the Tuesday after the holiday.
    b. Labor Day, work shall cease on the Friday before the holiday and may resume the Tuesday after the holiday.
    c. 4th of July
        - 2022 work shall cease on the Friday before the holiday and may resume the Tuesday after the holiday.
        - 2023 work shall cease on the Friday before the holiday and may resume the Wednesday after the holiday.
        - 2024 work shall cease on the Wednesday before the holiday and may resume the Monday after the holiday.
        - 2025 work shall cease on the Thursday before the holiday and may resume the Monday after the holiday.

SPECIAL PROVISION
SECTION 108
PAYMENT
(Steel Cost Adjustment)

This Special Provision was developed to minimize risk to the Contractor and steel fabricator(s) associated with current volatile fluctuations in the cost of steel materials.

Description Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices. All prices and costs are in U.S. Dollars (USD).

Types of Steel Products An adjustment will be made for fluctuations in the cost of plate and rolled-shape steel used in the fabrication of steel for Contract pay items covered under the following sections of the Standard Specification:

- Section 504, Structural Steel
- Section 507, Railings

The adjustments shall apply to the above items when they are part of the original Contract or Extra Work added by Contract Modification and paid for by agreed unit prices. The adjustments shall not apply when the item is Extra Work added by Contract Modification and paid for at a lump sum price or by Force Account.

Documentation Sufficient documentation shall be furnished to the Department to verify the following:

1. The dates on which steel was shipped from the mill to the fabricator, and quantity of steel, in pounds, shipped on those dates.
2. The quantity of steel, in pounds, incorporated into the various pay items covered by this Special Provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment Steel cost adjustments shall be computed as follows:

SCA = Q X D

Where: **SCA** = steel cost adjustment, in USD
Q = quantity of steel incorporated into the work, in pounds
D = price factor, in USD per pound

$$\mathbf{D = MP_B - MP_A}$$

Where: **MP_B** = The Platts Steel Spot Market Prices for Plate, as published by the Engineering News- Record, for the month the steel is shipped from the mill. The price will be converted from USD per ton to USD per pound.

MP_A = The Platts Steel Spot Market Prices for Plate, as published by the Engineering News- Record for the month prior to the bid opening, for work paid for at the Contract price; or for the month the Contract Modification is signed by the Contractor for Extra Work that is paid for by agreed unit prices. The price will be converted from USD per ton to USD per pound.

The total weight of the steel that will be used to calculate the steel cost adjustment for the respective Pay Items is shown in the following table:

Standard Specification Section	Total Weight of Steel (lbs.)
504, Structural Steel (Eastern Avenue Br.)	85,190
504, Structural Steel (Eaton Brook Br.)	172,300
504, Structural Steel (Lambert Road Br.)	172,300
504, Structural Steel (Clewleyville Road Br.)	187,000
504, Structural Steel (Levenseller Road Br.)	90,950
507, Railings (Eastern Avenue Br.)	8,440
507, Railings (Eaton Brook Br.)	10,205
507, Railings (Lambert Road Br.)	10,160
507, Railings (Clewleyville Road Br.)	10,830
507, Railings (Levenseller Road Br.)	8,440

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the Contract Bid date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the MP_B will be based on the date the steel arrives at the jobsite. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment Steel cost adjustments may be positive or negative but will only be made when there is a difference between the MP_A and MP_B in excess of five percent, as calculated by:

Percent Difference = $\{(MP_B - MP_A) / MP_A\}$ x 100

Steel cost adjustments will be calculated by the Department and will be paid or deducted when all other Contract requirements for the applicable items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustments will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The steel cost adjustments shall not apply during any time after the Contract Completion

Date when the Contractor is being assessed Liquidated Damages.

Cost adjustments, if any, shall be made by Contract Modification in accordance with this Special Provision.

SPECIAL PROVISION
SECTION 202
REMOVING STRUCTURES AND OBSTRUCTIONS
(Profile Milling Concrete Wearing Surface)

202.063 Description This Work shall consist of overcasting and profile milling the new concrete wearing surface as shown on the Plans, and as specified herein.

Project specific locations: this Special Provision only applies to the concrete deck on the Eastern Avenue and Clewleyville Road Bridges.

The equipment for profile milling the concrete wearing surface shall be a power operated milling machine or grinder capable of removing non-reinforced concrete to the required depth, transverse cross slope, and profile grade using an automated grade and slope control system. The controls shall automatically increase or decrease the concrete removal depth as required, and readily maintain desired cross slope, to compensate for surface irregularities in the existing surface. The equipment shall be capable of accurately establishing profile grades by referencing from a fixed reference such as a 30 foot minimum contact ski (floating beam), 24 foot non-contact ski (floating beam) with 3 or more sensors; or 3 non-contact sensors directly affixed at the fore, mid, and aft points of the milling machine. Grade control sensors shall all be located on the same side. A single sensor, contact or otherwise, shall not be permitted unless otherwise approved by the Department.

The rotary drum shall utilize carbide tip tools spaced not more than $^{5}/_{16}$ inches (8mm) apart and a minimum triple wrap configuration. The difference in height from the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed ¼ inch. The forward speed of the milling machine shall be adjusted to produce a milled surface meeting the groove spacing, groove depth, and surface tolerance requirements of this specification. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform surface texture. The milled surface shall comply with the surface tolerance limits as specified in Table 3 of Standard Specification Section 502.13.E; measurements will be considered from top of ridges only.

202.07 Method of Measurement Profile milling concrete wearing surface will be measured for payment by the square yard of the complete surface area of the wearing surface being milled excluding areas recessed for expansion joints, bridge drains, curb lines, and medians.

202.08 Basis of Payment The accepted quantity of Profile Milling Concrete Wearing Surface will be paid for at the Contract unit price per square yard which price will be full compensation for concrete overcasting, removing and disposing of concrete waste material and concrete slurry, and all labor, equipment, and incidentals required to satisfactorily complete the Work.

Pay Item	Pay Unit
202.31 Profile Milling Concrete Wearing Surface	Square Yard

Brewer-Eddington
WIN 18915.00
August 14, 2021

SPECIAL PROVISION
SECTION 202
REMOVING STRUCTURES AND OBSTRUCTIONS

This section is amended by addition of the following:

Description. This work shall consist of removing and disposing of an existing tri-chord overhead signing structure, support columns, attached aluminum plank guide signs, sign attachment hardware, foundations, and incidental materials of the existing structure at Station 36+40 Right.

Construction. The existing tri-chord overhead signing structure, support columns, attached aluminum plank guide signs, sign attachment hardware, and incidental materials of the existing structure shall be disassembled and transported to an approved disposal site. The Contractor may salvage any components for their own reuse, at their option. Foundations shall be completely removed.

Method of Measurement. Removing Structures and Obstructions will be measured by the Lump Sum for each structure or obstruction designated on the plans or in this special provision to be removed.

Basis of Payment. The accepted quantity of Removing Structures and Obstructions will be paid at the contract lump sum price and will be full compensation for all labor, materials and equipment necessary for removal and disposal of all materials, unless otherwise noted. Removal of existing signage and sign supports on the project, other than as noted in this special provision, that is not noted to be reinstalled on the project will be considered incidental to the Section 645 pay items of the contract. Payment for removal of existing signing and lighting foundations on the project, other than as noted in this special provision, will be made under Item 626.36 Remove or Modify Concrete Foundation.

Payment will be made under:

Pay Item	Pay Unit
202.01 Removing Structures and Obstructions	Lump Sum

SPECIAL PROVISIONS
SECTION 202
REMOVING STRUCTURES AND OBSTRUCTIONS
(Removing Pavement Surface)

The March 2020 Revision of the Standard Specifications, Section 202-Removing Structures and Obstructions, subsection 202.061-Removing Pavement Surface, has been removed and replaced in its entirety by the following:

202.061 Removing Pavement Surface The equipment for removing the bituminous surface shall be a power operated milling machine or grinder capable of removing bituminous concrete pavement to the required depth, transverse cross slope, and profile grade using 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 equipment shall be capable of accurately establishing profile grades by referencing from a fixed reference such as a 30 foot minimum contact ski (floating beam), 24 foot non-contact ski (floating beam) with 3 or more sensors; or 3 non-contact sensors directly affixed at the fore, mid, and aft points of the milling machine. Systems designed to incorporate a contact sensor located at the mid-point of the milling machine in lieu of the non-contact sensor will be permitted. Grade control sensors shall all be located on the same side. A single sensor, contact or otherwise, shall not be permitted unless otherwise approved by the Department.

The rotary drum shall be a minimum of 7 feet in width and utilize carbide tip tools at a minimum triple wrap configuration. The difference in height from the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed ¼ inch. The forward speed of the milling machine shall be adjusted to produce a milled surface meeting the groove spacing, groove depth, and surface tolerance requirements of this specification. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture. The Department may evaluate the texture of the milled surface for information purposes by performing the Sand Patch test according to ASTM E 965.

The Contractor shall locate and remove all objects in the pavement through the work area that would be detrimental to the milling or grinding machine. Any structures or obstructions left within the travel lane or shoulders shall have tapers installed according to Standard Detail 202(01). The finished milled surface will be inspected before being accepted, and any deviations in the profile exceeding ½ 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 centerline will be corrected. All corrections will be made with approved methods and materials. Any areas that require corrective measures will be subject to the same acceptance tolerances. Excess material that becomes bonded to the milled surface will be removed to the Resident's satisfaction before the area is accepted.

On roadways with adjoining lanes carrying traffic, the Contractor shall remove the pavement surface in each lane per the conditions in Table 1, unless otherwise noted by the Department in Special Provision, Section 105 – Limitations of Operations.

TABLE 1: MILLING CONDITIONS FOR ADJOINING LANES

Depth (At Centerline)	Milling Conditions
Vertical Longitudinal Joint	
2" and less	The Contractor may remove the pavement on a single travel lane width for each production day and will be required to mill the adjacent section of travel lane before the end of the following calendar day.
Greater than 2"	The Contractor shall remove the pavement over the full width of the traveled way section being paved that day.
12:1 Tapered Centerline Joint	
1 ½" to 2"	The Contractor may remove the pavement on a single travel lane width for each production day and will be required to mill the adjacent section of travel lane before weekend or holiday suspension. A maximum unmatched centerline joint length of 0.5 miles will be permitted over the weekend.
Greater than 2"	The Contractor shall remove the pavement on a single travel lane width for each production day and will be required to mill the adjacent section of travel lane before the end of the following calendar day.

The Contractor will be required to remove the pavement over the full width of the mainline traveled way, regardless of highway type, cut depth, or longitudinal joint type prior to Memorial Day, July 4th, Labor Day, suspensions exceeding three days, or other dates as specified by Special Provision, Section 105 – Limitations of Operations.

The Contractor will also be responsible for installing additional warning signage that clearly defines the centerline elevation differential hazard. Unless otherwise addressed in the contract, the Contractor shall install additional centerline delineation such as a double RPM application, or temporary painted line. The Traffic Control Plan shall be amended to include this option and the additional requirements. All signs and traffic control devices will conform to Section 719.01, and Section 652, and will be installed prior to the work, at a maximum spacing of 0.50 mile for the entire length of effected roadway section. If this option is utilized, all additional signing, labor, traffic control devices, or incidentals will not be paid for directly, will be considered incidental to the appropriate 652 items.

On roadways with immediately adjacent shoulders, the Contractor shall remove the pavement surface in each lane per the conditions in Table 2, unless otherwise noted by the Department in Special Provision, Section 105 – Limitations of Operations.

TABLE 2: MILLING CONDITIONS FOR THE EDGE OF TRAVELED WAY

Depth (At Edge of Traveled Way)	Conditions
2" and less	The Contractor may leave a vertical edge joint exposed for up to **21 days** after milling is performed. The Contractor shall treat vertical edge joints exposed beyond 21 days per the criteria below.
Greater than 2"	The Contractor shall treat vertical edge joints exposed per the criteria below.

When required by Table 2, the Contractor shall treat vertical edge joints through one of the options below:

1. The vertical edge shall be tapered to a zero edge by means of milling a 12:1 transition from the edge of traveled way onto the shoulder before opening the lane to traffic. Tapers shall be removed to form a vertical edge prior to the placement of the new pavement course. No additional payment will be made for tapers, or taper removal.
2. An additional 2 feet of pavement shall be removed from the shoulder to eliminate the vertical edge at the edge of travelway before opening the lane to traffic. Unless otherwise authorized by the Department, no additional payment will be made for the additional milling.
3. A pavement layer shall be placed to reduce the vertical edge to 1 inch or less before opening the lane to traffic.

As a minimum, the use of temporary painted line, or RPMs placed along the edge of traveled way at 200 foot intervals is required for all elevation differentials. When pavement milling is extended into the shoulder (including milled tapers), appropriate channelization devices shall be placed 2 feet outside the edge of the vertical face at intervals not exceeding 600 feet, and RPMs shall be placed on the remaining pavement surface along the vertical edge at 200 foot intervals. Uneven pavement signs shall be placed at a maximum spacing of ½ mile when any pavement milling operations leaves an exposed uneven pavement surface.

Weepers shall be ground across the full width sections adjacent shoulders or remaining pavement surface matching the milled travel way or shoulder milled depth to minimize water ponding in any lanes carrying traffic. Weepers shall typically be 18 - 24” inches in width, installed along each lane, at a frequency of approximately one per half mile at locations as directed by the Resident or in areas that will provide drainage for the milled areas. Installation of weepers will not be paid for directly but will be considered incidental to the contracts pavement removal item. The replacement of mix in the weeper locations shall be performed concurrently within the pavement placement operation closure using the appropriate HMA item produced for the Contract or a MaineDOT approved 9.5mm HMA. There will be no separate payment for repaving the weeper locations as they are considered incidental to the square yard price of the contracts pavement removal item.

Any areas of concern, such as de-lamination or pot-holing shall be identified on a continuous basis as milling progresses. Proper corrective action will be determined by the Resident and paid for under the appropriate contract items, and if required, completed prior to opening lane to traffic. Any issues that arise up to 7 calendar days after being milled will be the responsibility of the MaineDOT unless otherwise noted in Special Provision Section 105 – Limitations Of Operations.

Basis of Payment

The square yard or hourly rental contract price will be full compensation for mobilizing to the site, de-mobilizing from the site, labor, supervision, cleaning of the milled surface, and all other incidentals required to complete the work. Hauling and stockpiling of the material will not be paid for directly, but will be considered incidental to the milling items.

Square Yard: Payment will be made at the contract unit price for the number of square yards removed.

Hourly: Payment will be made at the contract unit price for the number of hours of operation removing pavement surface as directed by the Resident. The equipment used for pavement removal shall be operated at the minimum speed of 50 fpm, unless the Resident directs otherwise for milled surface quality reasons, or traffic control limitations impact pavement removal operations, or site conditions make operations at the prescribed rate unreasonable. Trimming to create a vertical face along curb line, guardrail, or around structures will be considered incidental to the 202.202 items. Additional trimming beyond the incidental work described will be paid under the appropriate rental items as listed in the Contract.

Pay Item	Pay Unit
202.202 Removing Pavement Surface	S.Y.
202.20201 Removing Pavement Surface (Hourly)	Hour

SPECIAL PROVISION
SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Under Section 202.02 of the Standard Specifications, ownership of buildings and all equipment, fixtures, and materials therein shall be interpreted as meaning all equipment, fixtures, and materials that are recognized as real property. Any items that are recognized as personal property are excepted and are reserved to the owner. If the bidder is in doubt as to whether any item not listed is real or personal property, they shall request a determination of the matter prior to date on which bids are to be received.

The following are to to be reserved to the property owners and/or occupants of parcels #21 - Foss and parcel #24 - Arbo. See Special Provision 104 (Reserve Limits)

Remaining buildings to be removed under Section 202 - Removing Structures and Obstructions of the contract will be made available to the Contractor as follows: Immediately.

Failure by the Maine State Department of Transportation to meet dates of availability may entitle the Contractor to time extension if requested by the Contractor, in writing, such request indicating delays in construction, if any, caused by changes in availability dates.

With the "Notice to Proceed", or when a building becomes available to the Contractor, the Department will designate whether rodent control measures are required or not.

The Contractor shall not remove a building until the Contractor has certified it to be free of rodents. Should rodent control measures be required, the Contractor shall procure the extermination services as soon as possible. The cost of extermination services until the building is found to be rodent free will be paid for under Section 109.3.7.5 – Force Account.

This building may or may not contain asbestos. Prior to any demolition of building(s) the Contractor will conduct an asbestos survey on the building(s) to determine if any asbestos exists. The survey will be conducted by a DEP certified Asbestos Inspector. No separate payment will be made for the survey and it shall be considered incidental. The survey results will be communicated with the Resident. If no asbestos is discovered, the demolition process may proceed. If asbestos is found, the Contractor will employ a DEP certified Asbestos Abatement Contractor for its' removal and disposal. The Department will bear all expenses incurred in the abatement of any asbestos containing material as detailed in Standard Specification 109.7.5 – Force Account. Any questions can be directed to the Office of Legal Service (624-3020).

Each building shall be removed promptly after certification that it is free of rodents. All subsequent inspection costs and extermination services necessary to assure that the building is rodent free at time of removal will be at the expense of the Contractor.

SPECIAL PROVISION
SECTION 203
EXCAVATION AND EMBANKMENT
(Special Fill - Streambed Material)

203.01 Description
This work shall consist of furnishing and placing granular material inside, and upstream and downstream of, a culvert to form a nature-like streambed.

This Special Provision is applicable to the following box culverts and associated stream reconstruction:

Felts Brook Bridge	STA 55+08
Felts Tributary Bridge	STA 64+14.4
Eaton Tributary Bridge	STA 273+48
Critter Crossing #2	STA 289+11

203.02 Materials
Special fill shall consist of a well graded mix of cobble, gravel, sand, and fines similar in size and shape to those found in natural channels and may be obtained as bank run or screening materials from earth borrow pits. Unwashed stone, and stone with naturally fractured faces will be allowed. Material from blasting or crushing operations will not be allowed.

Where applicable, suitable material excavated on-site within the limits of the stream channel in accordance with Special Provision Section 203, Dredge Materials, may be used to meet the gradation requirements, or as filler material.

Material Descriptions
Special fill shall consist of materials that conform to the following requirements:

A. *Streambed Gravel* – Shall consist of well graded aggregate that meets the requirements of Standard Specifications Subsection 703.06(c) for Type D aggregate for subbase, but shall not contain any Recycled Concrete Aggregate.

B. *Filler Material* – Filler material shall not contain oversized stones larger than 6 inches and the fines content shall be adequate to fill and seal the voids so that water ponds on the surface of the streambed. The material may be obtained from earth borrow pits, dredge, on-site excavation, or other sources approved by the Resident. Filler material shall consist of a well graded mix of gravel, sand, and fines free from vegetable matter, debris, peat, and other unsuitable material. The Resident will determine the suitability of the material by visual inspection.

Testing and Acceptance

The Contractor shall identify the source and proposed mix for inspection at least 10 working days prior to the start of streambed construction. Special Fill shall conform to the grading requirements at the time it is placed to form the streambed.

- *Streambed Gravel* – The Contractor shall furnish to the Resident a copy of gradation test results from a certified laboratory for the Streambed Gravel portion of the mix. The Department will obtain samples for Acceptance Testing prior to placement.
- *Filler Material* – Will be accepted on the basis of visual inspection by the Resident.

203.03 Construction Requirements

1. Construct a channel and a roughly trapezoidal-shaped or vee-shaped streambed surface as shown on the plans or established with in accordance with Special Provision Section 610, Void-Filled Riprap.

2. Place special fill in well mixed layers without pockets of either fine or coarse material and in two lifts of roughly equal thickness when the required total depth is greater than 12 inches. Larger stones may protrude above the average surface but shall be well embedded in the mix. Some handwork may be required to attain the specified shape and thickness.

3. Special fill shall be compacted and thoroughly washed-in with water immediately after placement of each layer. After the initial compaction, place additional Streambed Gravel to fill voids and continue washing in. If the Streambed Gravel does not contain enough fines to seal the surface so that water ponds on the streambed, Filler Material shall be added. Wash-in filler material until water remains on the surface with minimal infiltration before placing the next layer.

4. Mechanical methods of compaction may be used with the approval of the Resident. If the Contractor uses mechanical methods the void-filling and washing-in requirements shall still apply.

5. Prior to exposure to natural flow conditions the streambed shall be thoroughly wetted and compacted with voids filled and the surface sealed, checked and approved by the Resident. After washing-in, the minimum thickness of the special fill shall be as called for on the plans with an allowable surcharge of up to 3 inches above the design grade.

203.04 Method of Measurement

Special Fill will be measured in place by the cubic yard.

203.05 Basis of Payment

The accepted quantity of special fill will be paid for at the contract price per cubic yard complete in place. Payment shall be full compensation for furnishing all materials, equipment, and labor and washing-in with water.

	Pay Item	Pay Unit
203.33	Special Fill - Streambed Material	CY

SPECIAL PROVISION
SECTION 203
Special Fill - Streambed Material
Culverts 66+73, 84+50, 95+80 and 133+85

203.01 Description This work consists of furnishing and placing rock, cobble and granular material inside of, and upstream and/or downstream of, a culvert to form a nature-like streambed.

203.02 Materials Special Fill shall consist of a well-graded mixture of sub-angular to sub-rounded rock, cobbles, and aggregate similar in size and shape to those found in natural channels and may be obtained as bank run or screening materials from earth borrow pits. Material from blasting or crushing operations will not be allowed.

Where applicable, suitable material excavated on-site within the limits of a stream channel in accordance with Special Provision Section 203, Excavation and Embankment - Dredge Materials, may be used in the mix to meet the gradation requirements below, or as Filler Material with the approval of the Resident.

Material Descriptions
Special Fill shall consist of materials generally conforming to the following requirements:

Small Stone ("SS") – shall be stones 6 inches average dimension and smaller, well graded and round to subangular; approximately 50% shall be at least 2 inches.

Streambed Gravel ("SG") - Shall consist of well graded aggregate that meets the requirements of Standard Specifications Subsection 703.06(c) for Type D aggregate for subbase, but shall not contain any Recycled Concrete Aggregate.

Filler Material ("FM") – The purpose of Filler Material is to fill and seal the voids so that water ponds on the surface of the streambed. Filler Material shall not contain oversized stones larger than 6 inches and the fines content shall be sufficient to fill and seal voids. Filler Material shall consist of a well graded mix of gravel, sand and fines free from vegetable matter, debris, peat and other unsuitable material. As appropriate, Streambed Gravel may be used as filler material, or the material may be obtained from on-site excavation, earth borrow pits, dredge, or other sources approved by the Resident. The Resident will determine the suitability of the material by visual inspection.

Testing and Acceptance
The Contractor shall identify the source and proposed mix for inspection at least ten (10) working days prior to the start of streambed construction. Special Fill shall conform to the grading requirements at the time it is placed to form the streambed.

- Stone: the grading of Stone shall be determined by the Resident in accordance with the Standard Specifications, Section 610.032.d Inspection.

- Streambed Gravel: Contractor shall furnish to the Resident a copy of gradation test results from a certified laboratory for the Streambed Gravel portion of the mix, after which Verification (Process Control) testing will be performed by the Department.

- Filler Material: will be accepted on the basis of visual inspection by the Resident.

Special Fill Mix

Special Fill shall contain approximately 33% Small Stone (SS) and 67% Streambed Gravel (SG), by volume. Special Fill shall be mixed and placed so as to minimize segregation; it may be mixed in the proportions

(1 part SS) : (2 parts SG)

Mix proportions and material gradations shall be within the above limits or as otherwise approved by the Department's Environmental Office and the Resident. Acceptance will be based on the test results, and visual inspection by the Resident.

203.03 Construction Requirements

- Special Fill thickness on centerline (CL) as indicated on plans

- For Special Fill thickness 2-ft or greater on CL, Special Fill shall be placed in 2 equal lifts; otherwise 1 lift.

- Special Fill shall be placed to create a V-Shaped channel. Special Fill at culvert wall shall be generally be 1-ft above finished CL, but shall not go above haunch of culvert. See attached typical sketch.

- After placing each lift: firmly embed stones and fill voids by hand tamping and washing-in with water. In addition to watering-in, mechanical compaction methods may be used with the approval of the Resident. Larger individual stones protruding more than 6 inches above the average surface grade shall be embedded, re-oriented, or replaced. After the initial compaction, place, spread and wash-in Filler Material on the surface to fill and seal any remaining voids so that water ponds on the surface.

- Thoroughly saturate the culvert streambed prior to exposure to normal flow conditions. Fill any remaining voids by washing-in Filler Material as described above. After washing-in, the depth of constructed streambed shall meet the average thickness requirements shown on the Plans and stated in this Special Provision.

- Carry culvert streambed Special Fill over inlet and outlet riprap aprons as shown on plans. Before placing Special Fill, fill voids in riprap (RR) with wash-in procedure as described above.

- The Contractor may elect to initiate filling the riprap voids by mixing riprap and Streambed Gravel in the proportion (3 parts RR) : (1 part SG) prior to placement of aprons.

203.18 Method of Measurement

Special Fill will be measured in place by the cubic yard.

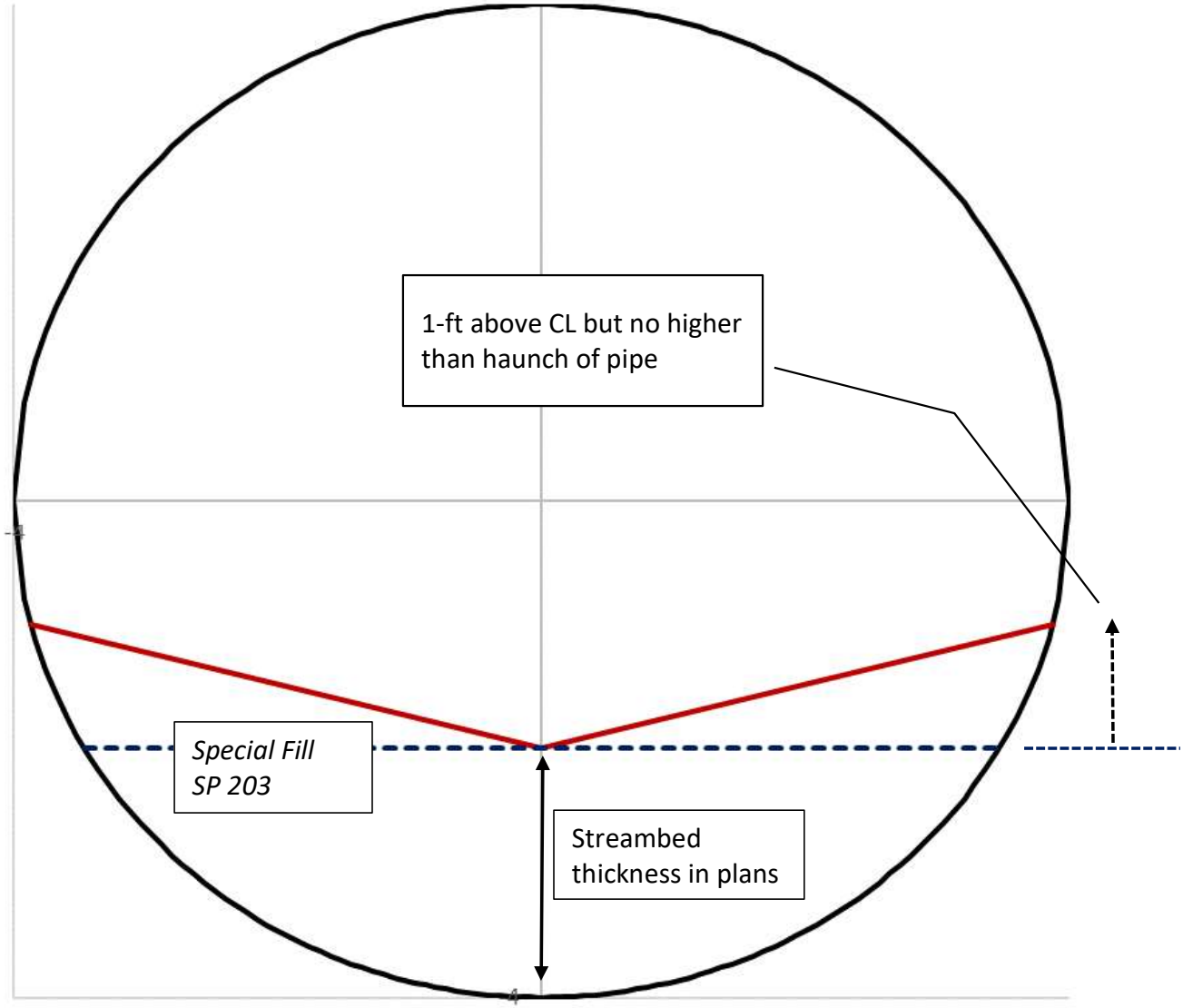
203.19 Basis of Payment

The accepted quantity of Special Fill will be paid for at the contract price per cubic yard complete in place. Payment shall be full compensation for furnishing all materials, including Filler Material, equipment and labor, and washing-in with water.

Payment will be made under:

Pay Item		Pay Unit
203.33	Special Fill	CY

Figure 1. V-Shaped Channel - Typical



Brewer-Eddington, I-395/Route 9 Connector
WIN 18915.00
Bridge Culvert Structures
Class B Waterbodies
August 27, 2021

SPECIAL PROVISION
SECTION 203
EXCAVATION AND EMBANKMENT
(Dredge Materials)

Description*:* Dredge Material (See MaineDOT Standard Specifications § 101.2 Definitions) is regulated as a Special Waste.

Dredge Material from the Brewer-Eddington, I-395/Route 9 Connector Project meets the CMR 418 § 5 criteria for Beneficial Use as Construction Fill. The Dredge Material from the subject project will be utilized as Construction Fill in areas within the project alignment.

Work associated with the Brewer-Eddington, I-395/Route 9 Connector Project will require excavation of select Dredge Material from seven locations total – three locations from Felts Brook / Felts Brook tributaries and four locations from Eaton Brook / Eaton Brook tributaries, all Class B Waterbodies. It is estimated that a project total of approximately 2630 cubic yards (CY) of dredge will be excavated from specific locations along the project alignment. There is onsite Beneficial Use for all Dredge Material.

MaineDOT Stationing	Stream	Estimated Dredge Quantity – Cubic Yards	Beneficial Use Locations – MaineDOT Stationing
Sta 55+08	Felts Brook	922	Sta 84+50 to 92+00 – Left of Centerline (LT) Sta 85+50 to 92+00 – Right of Centerline (RT)
Sta 66+73	Felts Brook Tributary	619	
Sta 61+14	Felts Brook Tributary	147	
Sta 133+85	Eaton Brook Tributary	248	Sta 131+50 to 133+50 LT and RT
Sta 140+90	Eaton Brook	143	Sta 144+00 to 144+50 LT and RT
Sta 273+50	Eaton Brook Tributary	429	Sta 271+50 to 272+00 LT and RT
Sta 298+49	Eaton Brook Tributary	114	Sta 298+00 to 298+50 LT and RT

It is acknowledged that excavation of Dredge for this work may include some boulders. The Maine Department of Environmental Protection (MDEP) has determined that sound boulders (rock 12-inches or more in diameter), that are free of adhering sediment or other contaminants, shall be deemed to be Inert Fill material and shall not be included in Dredge Material Quantities.

CONSTRUCTION REQUIREMENTS

Management: The Contractor shall Beneficially Use all Dredge Material excavated from within the Brewer-Eddington, I-395/Route 9 Connector Project alignment in the areas designated by MaineDOT. The Contractor shall ensure that Dredge Material is placed into fill areas identified by MaineDOT for beneficial use.

Method of Measurement: Excavation of Dredge Material will be measured for payment under related Contract items.

Basis of Payment: Payment for the Beneficial Use of Dredge Material will be incidental to the Contract Pay Items.

Payment shall be full compensation for dewatering, managing, transporting, and placement of Dredge Materials.

SPECIAL PROVISION
SECTION 203
EXCAVATION AND EMBANKMENT
(Ultra-Lightweight Foam Glass Aggregate)

203.01 Description

The following is added to Subsection 203.01 of the Standard Specifications:

The work shall consist of furnishing all labor, equipment and materials, including supplying the Lightweight Foam Glass Aggregate (ULFGA), and performing all operations required to install ULFGA fill to the limits shown on the Plans or as approved by the Resident (for the work of this section the term Resident will include the Geotechnical Engineer). All work performed under this Special Provision shall be coordinated with the Resident. The work shall include separating pavement subbase materials (above) from ULFGA fill using a geotextile at the locations shown on the Plans. The work shall also include separating the soils present at embankment subgrade (below) from ULFGA using a geotextile at the locations as shown on the Plans and as outlined herein. The Contractor shall furnish all labor, materials, equipment, tools, and appurtenances required to complete the Work specified in this Section, including:

1. Preparation of subgrade.
2. Storage and handling of ULFGA.
3. Protection of all existing utilities and structures.
4. Protection of geotechnical instrumentation.
5. Placement and compaction of ULFGA fill to the limits shown on the Plans.
6. Placement of geotextile as specified herein and to the limits shown on the Plans.

203.02 Materials

The following is added to Subsection 203.02 of the Standard Specifications:

The Contractor shall supply and install ULFGA fills that conforms to the following requirements:

1. ULFGA shall be made from of a minimum of 95% recycled glass.
2. ULFGA shall meet the gradation specifications presented below upon delivery per ASTM C136/136M-19. Gradation tests shall conform to the requirements of AASHTO Method T27.

Sieve Designation	Percentage by Weight Passing Square Mesh Sieve
4-in.	100
2 ½-in.	85-100
3/8-in.	0-15

3. The as-manufactured ULFGA shall have a maximum dry bulk density of 15 pounds per cubic foot (pcf) per ASTM C29/29M-17a. The as-delivered ULFGA shall have a maximum compacted moist bulk density of 18 pcf per ASTM C29/29M-17a.
4. The manufacturing process shall produce a closed cell ULFGA material, which is non-leaching.
5. The ULFGA shall have a minimum peak friction angle for normal stresses between 500 and 1,000 psf of 45 degrees per ASTM D3080/D3080M-11.
6. The ULFGA manufacturer must demonstrate experience of manufacturing a minimum of 100,000 cubic yards of ULFGA meeting the requirements of this Section.

Geotextile fabric shall be placed as follows to separate the ULFGA fill from adjacent materials:

1. Directly on the prepared subgrade surface beneath the ULFGA at Felts Brook Tributary culvert (between Sta. 63+35 and Sta. 64+85) and the highway culvert at Sta. 66+74 (between Sta. 66+20 and Sta. 67+30).
2. Between the UFLGA cell and the adjacent Common Borrow embankment fill material upstation and downstation of the Felts Brook Tributary culvert and the highway culvert at Sta. 66+74.
3. Between the top surface of ULFGA Stage 2 fill and the aggregate pavement subbase materials.

Geotextile fabric is not required beneath the ULFGA where ULFGA is placed on top of Stage 1 embankment fill (Common Borrow). Geotextile fabric is also not required on embankment side slopes, between ULFGA and Topsoil/Dirty Borrow.

The geotextile fabric shall be a non-woven, staple fiber, needle-punched, polypropylene geotextile. The geotextile shall consist of punched, non-woven geotextile with a minimum grab tensile strength of 160 lbs per ASTM D4632 and shall meet the requirements of Subsection 722.04 for Separation Geotextile.

203.021 Submittals

The following subsection is added to Standard Specification 203:

The Contractor shall submit an Installation Plan to the Resident for approval a minimum of 30 calendar days prior to the first scheduled delivery of ULFGA material to the site. The Installation Plan shall include but may not be limited to the following:

1. The name and address of the ULFGA supplier(s).
2. Manufacturer's specifications, catalog cut sheets, laboratory testing results, and other product data needed to demonstrate compliance with the requirements specified herein.
3. Written certification from manufacturer's quality control testing laboratory indicating that the product meets or exceeds the gradation, strength, compacted unit weight, and internal friction angle requirements specified herein. The laboratory test results shall be completed within 60 calendar days of submitting the Installation Plan to the Resident. The Contractor shall submit additional laboratory testing results to the Resident for each 500 cy delivered to the site, prior to delivery of the UFLGA material to the site.
4. Two (2) bulk samples of ULFGA.
5. Proposed means of delivery to the site and stockpiling (if proposed).
6. Proposed equipment specifications and procedures for placing separation geotextile and placing and compacting ULFGA.
7. Separate schedules for placement and compaction of the ULGFA in Special Embankment Construction Area 1, Area 2 and Area 4 as shown on the Plans.

203.04 General

The following is added to Subsection 203.04 of the Standard Specifications:

ULFGA Product Delivery, Storage and Handling

1. Deliver, store, and handle materials in accordance with manufacturer's recommendations.
2. During all stages of manufacture, shipment, storage, and construction, the Contractor shall minimize the amount that the ULFGA material moves on site to prevent physical damage. Construction equipment other than for placement and compaction of ULFGA shall not operate on the exposed ULFGA surface until a minimum 12-in. thickness of aggregate subbase material (i.e., cover material) is placed over the ULFGA. The cover material shall be placed and compacted within 48 hours of placing and compacting the final lift(s) of ULFGA in an area. Until that time, operation of construction equipment directly on the ULFGA shall be limited to light-duty equipment with rubber tires.
3. During delivery, storage and handling, the Contractor shall not contaminate the ULFGA with earth material or any other debris or aggregate materials.
4. The Contractor shall protect the ULFGA before, during, and after construction as recommended by the material manufacturer.

ULFGA Installation

1. The Contractor shall provide a minimum of five (5) working days' notice to the Resident prior to the placement of any ULGFA fill.
2. The Contractor shall place the ULFGA fill to the plan and vertical limits shown on the Plans. Preparation of the subgrade shall include excavation with a smooth-edged bucket to minimize disturbance of the subgrade materials (i.e., Stage 1 common borrow embankment fill). If deemed necessary by the Resident, the Contractor shall proof compact soil subgrades prior to placement of ULFGA fill to the satisfaction of the Resident at no additional cost to the Department.
3. Compaction shall be performed in the presence of the Resident who will observe performance of the selected equipment and compactive effort, and will modify requirements for the number of passes and lift thickness stated herein if needed for specific compaction equipment.
4. The areas to be filled using ULFGA shall not have standing water, ice, organic or otherwise unsuitable materials present prior to placement. If encountered, the Contractor shall excavate these materials and replace them with compacted fill meeting the requirements of Subsection 703.18 Common Borrow.
5. A non-woven geotextile fabric shall be used to separate the ULFGA fill cell from the pavement subbase material (above) at all locations. The geotextile will act as a separator between the ULFGA and adjacent materials. Adjacent panels of geotextile shall be either sewn together or overlapped a minimum of 12 inches. The Contractor shall not place geotextile fabric until the subgrades have been inspected and approved by the Resident.
6. A non-woven geotextile fabric shall be used to separate the ULFGA fill cell from naturally deposited subgrade soils and adjacent Common Borrow embankment fill at the precast concrete box culvert constructed at Felts Brook Tributary and at the reinforced concrete pipe culvert constructed at Sta. 66+74. The geotextile will act as a separator between the ULFGA and adjacent materials. Care shall be taken during placement of topsoil/loam on embankment side slopes to prevent damage to ULFGA. Adjacent panels of geotextile shall be either sewn together or overlapped a minimum of 12 inches. The Contractor shall not place geotextile fabric until the subgrades have been inspected and approved by the Resident.
7. To limit possible degradation, the geotextile shall not be exposed to the elements for more than 14 days after placement.
8. ULFGA may be dumped and spread in place. Construction equipment other than for placement and compaction shall not operate on the exposed ULFGA.
9. In open areas, ULFGA fill shall be placed using tracked equipment (excavator and dozer) in uncompacted lifts not exceeding 18 inches in loose thickness.
10. Compaction in open areas shall be performed with a pneumatic rubber tired static roller with maximum ground pressures of 1,500 psf. Sufficient compaction has been achieved when, in the judgement of the Resident, the material ceases to densify further with additional passes of the roller. Excessive compaction shall be avoided to

minimize crushing of the ULFGA particles.

11. In areas not accessible by larger equipment (e.g., adjacent to bridge abutments and wingwalls, near utilities, etc.), ULFGA fill shall be placed using smaller tracked equipment in uncompacted lifts not exceeding 12 inches in loose thickness. Compaction in these areas shall be performed using a small vibrating plate compactor with a maximum operating weight of 250 lbs. Sufficient compaction has been achieved when, in the judgement of the Resident, the material ceases to densify further with additional passes of the plate compactor. Excessive compaction shall be avoided to minimize crushing of the ULFGA particles.

ULFGA Testing

1. The Contractor shall measure the compacted bulk density at the site per the requirements of ASTM C29/29M-17a and shall submit documentation of the results to the Resident. A minimum of one (1) test shall be performed for every 500 cubic yards of ULFGA delivered to the site. All bulk density testing shall be performed in the presence of the Resident.
2. The Resident shall visually observe compaction of each lift of ULFGA for sufficient compaction. The Contractor shall not place additional lifts of ULFGA until the previous lift has been inspected and approved by the Resident.
3. Compaction shall be performed in the presence of the Resident who will observe performance of the selected equipment and the compactive effort, and establish requirements for the number of passes, and lift thickness for each piece of specific compaction equipment that the Contractor intends to use.

203.18 Method of Measurement

The following is added to Subsection 203.18 of the Standard Specifications:

Lightweight Fill (ULFGA) will be measured by the Cubic Yard in place to limits shown on the Plans.

203.19 Basis of Payment

The following subsection is added to Section 203 of the Standard Specifications:

Lightweight Fill (ULFGA) will be paid for at the contract unit price per in place Cubic Yard, which shall be full compensation for all labor, materials, equipment, and incidentals required to supply, deliver, protect, place and compact the ULFGA and separation geotextile as described herein and shown on the Plans including the creation of an Installation Plan. Removal and replacement of ULFGA material that has been damaged by the Contractor, in the opinion of the Resident, shall be incidental to the work, as directed by the Resident. No additional compensation shall be provided for separation geotextile.

Payment will be made under:

	Pay Item	Pay Unit
203.4338	Lightweight Fill - Foam Glass Aggregate	Cubic Yard

SPECIAL PROVISION
SECTION 209
WICK DRAINS
(Prefabricated Vertical Drains)

209.01 Description

This work shall consist of furnishing all necessary labor, equipment, and materials, and performing all operations required to install prefabricated vertical drains (PVDs) in accordance with the details shown on the Plans and with the requirements outlined herein. The PVDs shall consist of a nominally 4-inch wide, band-shaped plastic core enclosed in a suitable jacket material and shall be spaced and arranged as shown on the Plans, or as otherwise directed by the Resident (for the work of this section the term Resident will include the Geotechnical Engineer). The work shall include installing PVDs through a PVD Drainage Layer/Sand Blanket (sand blanket) to a minimum depth of 2 feet below the bottom of the marine clay stratum or to mandrel refusal below the bottom of the marine clay, whichever is shallower. Requirements for the sand blanket are outlined in Special Provision 211 – PVD Drainage Layer/Sand Blanket. Pre-augering, spudding or other methods shall be performed as necessary to penetrate the sand blanket material, frozen ground, in-situ fill soils and debris, dense naturally-deposited soils or other materials present above or within the marine clay deposit.

PVDs shall be installed to the limits and spacing shown on the Plans. Site clearing within the footprint of the special embankment construction areas (by the Contractor), installation of settlement platforms (by the Contractor), and initialization of settlement platforms (by the Department) shall be completed prior to PVD installation. The sand blanket shall be placed and compacted to facilitate easy installation of the PVDs. After PVD installation and prior to the placement and compaction of embankment fill, vibrating wire piezometer and inclinometer instrumentation shall be installed (by the Contractor) and initialized (by the Department) in accordance with the requirements of Special Provision 639.

The Contractor shall be responsible for preparing the site to allow safe access and operation of PVD equipment and for preparation and protection of the subgrade soils and PVD installation.

The PVDs are intended to accelerate consolidation settlement of the marine clay underlying the site and facilitate dissipation of excess pore water pressure caused by the placement of the embankment fill. Embankment fill shall not be placed until PVD installation is complete and geotechnical instrumentation has been installed and initialized per the requirements of Special Provision 639.

MATERIALS

209.02a PVD - General

PVDs shall have a minimum 4-inch width and shall be of newly manufactured materials

and consist of a polyethylene or polypropylene drainage core enclosed in or integrated with a geotextile jacket. The PVDs shall be band shaped with a width to thickness ratio between 10 and 50. The geotextile jacket shall be made of non-woven fabric of continuous filaments of 100 percent polypropylene or polyethylene. The jacket shall also allow free passage of pore water into the core of the PVD without loss of soil material or piping (i.e., jacket shall have a range of openings so that it performs like a graded filter). The core shall provide continuous vertical channels or studs on both sides of a central continuous backing strip. The PVDs shall be capable of resisting all bending, punching, compression, and tensile forces imposed during installation and during the design life of the PVD without damage and so that the discharge capacity is not adversely affected. The PVD shall retain its permeability and be able to continue to transmit drainage along its entire length even when subjected to as much as 50 inches of vertical compression that is anticipated to occur in some areas of the site. The quality of the jacket and core materials shall be resistant for a period of 36 months to wet rot, mildew, bacterial action, insects, salts in solution in groundwater, acids, alkalis, and solvents and any other significant deleterious ingredients in the site groundwater. The jacket and core materials shall be environmentally safe.

PVD anchors shall be free of rust and sharp or jagged edges. The anchorage arrangement shall fit at the bottom of the mandrel or sleeve, permit the installation of the PVD to the required depth, and anchor the PVD tip at that depth during mandrel withdrawal. The dimension of the anchor shall conform as closely as possible to the lateral dimension of the mandrel so as to minimize soil disturbance during PVD installation. The anchor system shall consist of either a bar or plate of the shortest practicable length or area that is necessary to secure the PVDs at the required bottom depth. Trial PVD installations per the requirements outlined herein shall be completed to demonstrate the effectiveness of the anchorage system.

A single type of assembled PVD shall be used on the project unless otherwise agreed to by the Resident. The actual type of PVD installed will be determined by the Contractor subject to the requirements specified herein and the review/comment of the Contractor's submittals by the Resident.

209.02b PVD - Jacket

The jacket shall be commercially available, non-woven polypropylene filter fabric.

The jacket material shall not be subject to localized damage (e.g., punching through the filter by sand/gravel particles). The jacket material shall be sufficiently rigid to withstand lateral earth pressures to the maximum project installation depth so that the vertical flow capacity through the core channels will not be adversely affected.

The jacket material shall be sufficiently flexible to bend smoothly during induced consolidation settlement without structural breakage. The function of the PVDs shall not be affected due to the lateral movements which will likely accompany large settlements. The jacket material shall not undergo cracking and peeling during PVD installation.

The geotextile jacket material shall conform to the following minimum specifications:

Test Item	Test Designation	Required Average Roll Value (Minimum)
Grab Tensile Strength	ASTM 4632	135 lbs.
Trapezoidal Tear	ASTM 4533	50 lbs.
Puncture Strength	ASTM 4833	38 lbs.
Elongation at Break	ASTM 4632	> 50%
Mullen Burst Strength	ASTM 3786	175 psi
Permittivity	ASTM 4491	0.45 sec-1
AOS	ASTM 4751	≤ US #70 Sieve

* The jacket material shall be tested in saturated and dry conditions. These requirements apply to the lower of the two tested conditions.

The jacket shall also have a minimum permeability of $1x10^{-5}$ cm/sec when tested according to ASTM D4491.

209.02c PVD - Core

The core shall be a continuous polyethylene or polypropylene plastic material fabricated to promote drainage along the long axis of the PVD. The core shall be in physical contact with the jacket but shall not be continuously bonded to the jacket.

The core material shall conform to the following specifications:

Item	Test Designation	Requirement* (Minimum)
Tensile Strength	(Uniaxial	235 lbs.
Elongation at Break	extension)	10%

* The core material shall be tested in saturated and dry conditions. These requirements apply to the lower of the two tested conditions.

The mechanical properties (strength and modulus) of the assembled PVDs shall equal or exceed those specified for the component geotextile jacket and core.

Splicing of the jacket and core shall not directly coincide. Necessary splices should be adequately offset to provide structural and hydraulic continuity.

The assembled drain shall have a minimum discharge capacity of 1.3 gal./min. as

determined by ASTM D4716.

The assembled drain shall have a minimum equivalent diameter of 2.65 in. using the following definition of equivalent diameter:

$$d_w = \frac{2(a+b)}{\pi}$$

d_w = equivalent diameter of a circular drain
a = drain thickness
b = drain width

PVD materials shall be labeled or tagged in such a manner that the information for sample identification and other quality control purposes can be read from the label. As a minimum, each roll shall be identified by the manufacturer including lot or control numbers, individual roll number, date of manufacture, and manufacturer product identification of the component parts (jacket and core).

During shipment and storage, the PVD rolls shall be wrapped in heavy paper, burlap, plastic, or similar heavy-duty protective covering. The PVD rolls shall be protected from sunlight, mud, dirt, dust, debris, and other detrimental substances during shipping, unloading and at on-site storage locations.

All material that is damaged during shipping, unloading, storage, or handling and/or does not meet the minimum requirements as stated herein will be rejected by the Resident and shall be immediately removed from the site by the Contractor. No payment shall be made for rejected material.

Material shall be stored on site under protective cover to minimize possible damage due to construction activities, sunlight, general weather conditions, and other site conditions.

209.02d PVD Drainage Layer/Sand Blanket

PVD Drainage Layer/Sand Blanket material (sand blanket material), the requirements of which are outlined in Special Provision 211 – Drainage Layer/Sand Blanket, shall be used to construct the PVD Drainage Layer. The sand blanket material shall be placed and compacted to the minimum limits shown on the Plans prior to PVD installation.

209.03 Contractor Requirements

The PVD manufacturer shall be a specialist in the manufacturing of PVDs and shall provide records of having successfully manufactured 1,000,000 linear feet of PVDs on a minimum of five (5) projects within the past five (5) years. Samples of PVD materials shall be submitted to the Resident for review a minimum of 30 calendar days prior to the first anticipated delivery of the material to the project site. The Contractor shall not deliver PVD materials to the site before the Resident has completed their review of all PVD related Contractor submittals and

all submittal comments have been resolved to the satisfaction of the Resident.

The Contractor shall hire a specialty PVD Contractor to install the PVDs. The PVD Contractor shall have a minimum of five (5) years of experience with the installation of PVDs and shall have successfully completed at least five (5) PVD installations within the last five (5) years of similar size (at least 1,000,000 linear feet) and equal to or greater technical complexity in similar subsurface conditions.

The PVD Contractor shall provide at least one (1) superintendent and one (1) operator for the PVD equipment with a minimum of five (5) years of experience with the equipment and with PVD installation. The PVD Contractor shall provide detailed information on the training and experience of any operators with less than five (5) years of experience for review by the Resident. In no case shall any superintendent have less than two (2) years of experience with the installation of PVDs.

209.04 Submittals

The Contractor shall submit information providing the technical specification of the PVD product. The submittal shall include a description of the equipment and installation schedule and particular descriptions of mandrel dimensions and PVD anchorage methods. The Contractor shall make all submittals not less than 30 calendar days prior to the start of PVD installation. Review of submittals by the Resident will not relieve the Contractor and the PVD Contractor of their responsibility to provide materials and equipment necessary to install PVDs in accordance with the Plans and Special Provisions. If, at any time, the Resident considers that the method of installation does not produce a satisfactory PVD, the PVD Contractor shall alter their method and/or equipment as necessary to provide PVD installations that comply with the requirements of the Plans and Special Provisions. The Contractor shall update and resubmit any and all portions of the submittal as changes occur during the course of the work.

The Contractor shall submit proof that the PVD Contractor has completed five (5) or more projects of similar size (at least 1,000,000 linear feet) and complexity on which they have successfully installed vertical PVDs within the last five (5) years. The following information shall be presented for each project listed as a reference:

1. Project name, location, and start/completion date.
2. Surface and subsurface conditions.
3. The PVD installation equipment and techniques used to install.
4. The minimum, maximum and average rates of PVD installation.
5. Average length of PVD installed and total linear footage of PVD installed.
6. client name and address, and the name and telephone number of the representative of the consultant and owner for whom the work was performed and who can attest to successful completion of the work.

The Contractor shall submit written notice of intended installation schedule, by week, at least 5 business days prior to the installation of any PVDs.

The Contractor shall submit details of the sequence and method of PVD installation. The submittal shall, at a minimum, provide the following specific information concerning the scheduled work:

1. Plan and narrative describing preparation of the site for PVD installation.
2. Size, type, weight, maximum pushing force, actual pushing force for anticipated installation equipment including rated energy of vibrating hammer (if used), track bearing pressure, and configuration of the installation rig.
3. Shop drawings showing PVD layout and identification numbers for each PVD that will be installed in each area where PVDs are required. Plan shall be to scale.
4. Dimensions, weight, material composition and length of the mandrel.
5. Details of PVD anchorages that are anticipated.
6. Means of determining the depth of the advancing PVD at any given time and the length of the PVD installed at each location.
7. Detailed description of proposed installation procedures, including whether water is anticipated to be needed to install PVDs.
8. Estimated minimum, maximum, and average rates of PVD installation.
9. Detailed description of proposed methods for penetrating/removal of the sand blanket material, frozen ground, in-situ fill soils and debris, dense naturally-deposited soils, or other materials above or within the marine clay (e.g., drilling, augering, coring, spudding, near-surface excavation).
10. Proposed plan and narrative for preparation and protection of the embankment subgrades and for constructing a stable working-surface for installation of PVDs and geotechnical instrumentation.
11. Detail sketch and description of proposed PVD splicing.
12. Manufacturer's literature on PVD material and installation.
13. Means of maintaining verticality/plumbness of the mandrel during PVD installation.

The Contractor shall submit PVD manufacturers certification that materials delivered to the site meet the minimum requirements specified herein, prior to delivery of PVDs. The submittal shall include the PVD supplier’s certification that delivered material has been properly stored away from sunlight, moisture and dirt. In addition, pertinent tests shall be performed by the manufacturer’s selected independent testing laboratory (having certification by an accreditation agency such as American Association for Laboratory Accreditation relative to the required test methods) on samples representative of PVD material to be used for this project. In addition, one 12-inch length of PVD material shall be collected by the PVD Contractor and submitted to the Resident for every 50,000 linear feet of installed material. The PVD Contractor shall record the date installed and the PVD roll number and cumulative linear footage from the start of work on the tag for each 12-inch PVD sample.

A minimum of two (2) weeks prior to the start of PVD installation, the Contractor shall submit a sample of the PVD, PVD anchor and a proposed splice. Each sample shall be at least 5 feet long. Samples of spliced PVD shall be long enough to include the splice plus a minimum of

2 feet of un-spliced PVD on both sides of the splice.

The Contractor shall submit proposed installation record forms to be used to track production PVD installation. Information on the forms shall include the following information, at a minimum:

1. Date and time of installation.
2. Rig number.
3. PVD identification number.
4. Horizontal coordinates.
5. Top elevation.
6. Installed length.
7. Length of pre-augering or spudding
8. Description of methods used to remove/penetrate materials that hindered PVD installation, including depths materials were encountered.
9. Description of any other interruptions.
10. Daily quantity summary.
11. Total quantity summary
12. Any other contract summary items.

The PVD Contractor shall submit a PVD installation record form for each PVD installation to the Resident within 24 hours of PVD installation. The Contractor shall submit interim reports to the Resident once every two weeks with PVD installation record forms, cumulative PVD length installed to date, and an updated PVD installation schedule. A final report with all final PVD installation record forms and final cumulative PVD installation length shall be submitted to the Resident within two (2) weeks after completion of PVD installation.

209.05 Project Conditions

Prior to bidding, the Contractor and PVD Contractor shall visit and examine the work site and all conditions thereon and take into consideration all such conditions that may affect this work.

The Contractor and PVD Contractor shall protect existing structures, underground utilities, overhead utilities, instrumentation, trees, buildings, utility poles, paved areas, and other construction from any possible or potential damage caused by the work outlined in this Section.

The Contractor shall be prepared to excavate, bench and place fill on the existing Wilson Street embankment slope at the south end of the project site as needed to provide a safe, working surface for equipment to install PVDs in this area of the site.

CONSTRUCTION REQUIREMENTS

209.06 PVD Installation

The PVD Contractor shall furnish equipment required for installation of nominal 4-inch wide PVDs. Equipment and means/methods shall cause a minimum of disturbance to soil subgrades prior to and during PVD installation operation and shall maintain the mandrel in a plumb position. The mandrel or sleeve shall be straight and shall be sufficiently stiff to prevent wobble or deflection during PVD installation.

PVDs shall be installed using a mandrel or sleeve that shall be inserted (pushed) into the soil. The mandrel or sleeve shall protect the PVD material from tears, cuts, and abrasions during installation, and shall be retracted after each PVD is installed. To limit disturbance of the marine clay, the dimensions and cross-sectional area of the mandrel shall be the minimum required to provide stable penetration of the soil deposits. Where needed, use auger/core/drill/spud/etc. of a diameter not greater than 8 inches to pre-drill or spud through the sand blanket material, frozen ground, in-situ fill soils and debris, dense naturally-deposited soils or other materials encountered above or within the marine clay.

The mandrel or sleeve shall be provided with an anchor rod, plate, or similar arrangement at the bottom to permit the installation of the PVD and to anchor the PVD tip at the required depth before withdrawal of the mandrel. The dimensions of the anchor shall conform as closely as possible to the dimensions of the mandrel to minimize disturbance of the marine clay. The Resident shall determine the acceptability of the anchorage system and installation procedure. The selection of anchoring system is the sole responsibility of the PVD Contractor. The selected anchor type shall disturb the least amount of surface area of soil necessary while securing the PVD in the ground. Changes to the anchoring system, if recommended by the Resident, shall be made by the PVD Contractor at no additional cost to the Department.

Prior to the start of PVD installation, the PVD Contractor shall demonstrate that their proposed equipment, means/methods, and materials produce a satisfactory PVD installation in accordance with the requirements stated herein and shown on the Plans. The PVD Contractor shall complete the minimum number of trial PVD installations in each special embankment construction area shown below. The trial installations shall be at specific production locations designated by the Resident.

1. Special Embankment Construction Area 1 (Sta. 51+00 to Sta. 82+00; Ramp D – Sta. 900+00 to 909+00; Ramp E – Sta. 700+00 to Sta. 717+50; Ramp F – Sta. 800+75 to Sta. 815+67) – 12 trial PVD Installations
2. Special Embankment Construction Area 2 (Sta.138+00 to Sta. 143+50) – 4 trial PVD installations
3. Special Embankment Construction Area 4 (Sta. 179+25 to Sta. 186+00) – 6 trial PVD installation

During the trial installations, the PVD Contractor shall demonstrate the intended splicing procedure at least twice by purposely cutting the band PVD and changing out a roll and

reattaching the PVD consistent with splicing requirements specified herein. The Resident may choose trial areas to determine the need for pre-augering prior to production installation. Additional trial PVDs may be required by the Resident at no additional cost to the Department if significant changes in PVD installation is noted. The PVD Contractor shall install all trial PVDs in the presence of the Resident who will observe the installations and determine the PVD Contractor's ability to install the PVDs to the required depths, while maintaining verticality tolerances and with proper splicing procedures. Upon completion of the trial PVD installations, the PVD Contractor and Resident shall agree upon the proposed equipment, methods, and materials before installing production PVDs.

Review by the Resident of the method or equipment used to install trial PVDs shall not constitute acceptance of the method for the remainder of the project. If, at any time during production PVD installations, the Resident believes that the method of installation does not produce satisfactory PVDs, the PVD Contractor shall alter their method and/or modify or change equipment as necessary to comply with requirements as stated herein, at no additional cost to the Department.

The Contractor shall clear the site within the footprint of the embankments as shown on the Plans. The Contractor shall place sand blanket material in each of the three special embankment construction areas with minimum thickness shown on the Plans and as specified herein. The Contractor shall place additional lifts of sand blanket material if needed to stabilize the site and/or provide a safe working surface for the PVD installation equipment.

Each PVD shall be laid out using surveying methods, numbered, and flagged by the PVD Contractor, relative to the project baseline and benchmark established by the Contractor. The Contractor and PVD Contractor shall take all reasonable precautions to preserve the flags and is responsible for any necessary additional layout and re-flagging needed to re-establish PVD locations prior to installation at no additional cost to the Department. The as-installed location of the PVDs shall not vary by more than 3 inches from the plan locations designated on the PVD Contractor's shop drawing submittal. The spacing of installed PVDs (in plan) shall be no greater than the dimensions shown on the Plans, as measured at ground surface. If needed, additional PVDs shall be installed in areas where the actual spacing is greater than the spacing shown on the Plans, to the satisfaction of the Resident, at no additional cost to the Department.

PVDs shall be installed from a working surface prepared by the Contractor to the depth required to vertically penetrate the marine clay by at least 2 feet into the underlying granular soil deposit, or to such depth as directed by the Resident. The Resident may vary the depths, spacing, or the number of PVDs to be installed, and may revise the plan limits for this work as necessary.

At each PVD location, a minimum 12-inch length of PVD shall be left protruding above the ground surface (top of sand blanket material) and cut off neatly at its upper end.

During PVD installation, the PVD Contractor shall provide the Resident with suitable means of determining the accurate depth of the PVD installed at each location. Footage shall be accurately and clearly marked and numbered on the mandrel in an easily visible location that can be read by the Resident during PVD installation from a safe distance.

PVDs shall be installed using static methods. PVDs that cannot be installed to the design penetration depths using only static methods shall be advanced using vibratory methods within the following restrictions.

1. A vibratory hammer shall not be used except in cases where design penetration cannot be achieved by using the full static force available to the mandrel, but only with the acceptance of the Resident.
2. Debris/material encountered above the marine clay deposit shall not be cause for use of a vibratory hammer for the installation of PVDs.

PVDs that are damaged or improperly installed will be rejected by the Resident and shall be abandoned in place. The PVD Contractor shall install additional PVDs to replace damaged PVDs or those out of specification tolerances as directed by the Resident at no additional cost to the Department.

Where PVDs are to be installed through frozen ground or through hard and dense materials above or within the marine clay soils, the PVD Contractor shall pre-auger, core, drill, or spud through these materials prior to installation of the PVD, as required by the site conditions, but only to the minimum depth needed to penetrate these materials. All predrilled locations shall be backfilled with either cuttings from the pre-augered hole or sand to the satisfaction of the Resident.

Equipment for installing PVDs shall be plumbed in both directions prior to installing each PVD and shall not deviate from the vertical by more than 3 inches in 10 feet during installation of any PVD at any time. The PVD Contractor shall provide means for measuring and monitoring plumbness of the mandrel at all times during PVD installation.

Installation techniques requiring driving or jetting of PVDs will not be permitted. The use of water may be needed if the PVD Contractor is unable to advance PVDs to minimum depths as outlined herein and/or if needed to facilitate anchoring of the PVDs below the bottom of the marine clay. Water, if needed, shall be introduced into the hole created by the mandrel during PVD installation to counteract hydrostatic uplift forces acting on the PVD anchor at depth. Use of water, if needed to install anchors to the depths required herein, shall be conducted by the PVD Contractor at no additional cost to the Department.

The Contractor should be aware that elevated water pressures were encountered at/near the interface between the marine clay and underlying glacial till during and after drilling of test borings BB-BEB-101, BB-BEB-102(OW), BB-BEB-103 and BB-BEB-104 during the Phase I subsurface investigation, and in borings BB-BEB-201, BB-BEB-202, BB-BEB-203, BB-BEB-204, BB-BEB-204A and BB-BEB-205 during the Phase II subsurface investigation. All of these borings were drilled in the vicinity of Eaton Brook (i.e., Area 2). Some of the elevated water pressures resulted in observed water levels inside the drill casing to rise above the existing ground surface.

PVD installation shall be performed without any damage to the PVD during advancement or retraction of the mandrel. In no case will alternate raising and lowering of the mandrel during PVD advancement be permitted. Raising of the mandrel will only be permitted after completion of a PVD installation, or upon abandonment from an attempted location.

Where materials are found above or within the marine clay that cannot be penetrated using normal and accepted procedures (e.g., drilling, augering, coring, spudding), the PVD Contractor shall install the PVD from the depth of the encountered materials to the working surface and immediately notify the Resident.

The PVD Contractor shall implement precautions necessary for protection of any existing utilities, structures, or other existing infrastructure.

The PVD Contractor shall install all production PVDs in the presence of the Resident. PVDs that are installed to the required penetration into the granular soil deposit below the marine clay, and which are not in violation of any restriction listed in this Special Provision, will be considered acceptable by the Resident.

The PVD Contractor shall coordinate the location of the PVDs with the location of settlement platforms, vibrating wire piezometers and inclinometers shown on the Plans.

The PVD Contractor shall be responsible for penetrating the soils present at the site as necessary to satisfactorily install the PVDs. Satisfactory installation may require removal or penetration of debris/materials that hinder PVD installation. As and if needed, the PVD Contractor may use augering, spudding, coring, or other drilling methods to remove/penetrate debris/materials that hinder PVD installation. The Contractor may use excavation methods to remove near-surface debris/materials encountered. Excavation into the naturally-deposited marine clay soils will not be allowed.

Splicing of PVD material shall be done in a workmanlike manner by stapling to provide structural and hydraulic continuity and a continuous smooth connection of the jacket of the PVD. Other means of splicing may be proposed by the PVD Contractor but may not be used without the review of the Resident. The jacket and core shall be overlapped a minimum of 6-inches at any splice. A maximum of one splice per installed PVD will be permitted.

209.07 Method of Measurement

PVDs will be measured by the Linear Foot installed. The length of PVDs to be paid for shall be the distance the installation mandrel tip penetrates below the working grade (i.e., top of minimum thickness of sand blanket material shown on the Plans) plus 1 ft. All measurements shall be rounded up or down to the nearest whole foot (i.e., increment less than or equal 0.5 rounded down, increment greater than 0.5 rounded up).

PVDs placed in excess of the length as specified herein will not be paid for unless the additional length was authorized by the Resident prior to or during the PVD installation.

209.08 Basis of Payment

Payment for PVDs shall be made at the contract unit price per Linear Foot. The unit price shall include full compensation for the cost of furnishing the full length of PVD material, installing the PVDs, including trial PVDs, altering of the equipment and methods of installation in order to produce the required end result in accordance with the Plans and Special Provisions, and shall also include the cost of furnishing all tools, materials, labor, equipment and all other costs necessary to complete the required work specified herein.

No direct payment will be made for unacceptable PVDs, or for any delays or expenses incurred through changes necessitated by improper or unacceptable material or equipment.

No direct payment will be made for mobilization, demobilization, debris/material clearance, or constructing any work platform(s). The cost of such shall be included in the unit price bid for PVDs.

Payment will be made as follows:

	Pay Item	Pay Unit
209.29	Prefabricated Vertical Drain	Linear Foot

SPECIAL PROVISION
SECTION 211
DITCH AND INSLOPE EXCAVATION
(Sand Blanket)

211.01 Description

The following is added to Subsection 211.01 of the Standard Specifications:

This work shall include, but is not limited to, providing all labor, materials, equipment and incidentals to place and compact a granular drainage layer (sand blanket) at the locations and to the minimum thicknesses shown on the Plans or as directed by the Resident (for the work of this section the term Resident will include the Geotechnical Engineer). The sand blanket is needed to provide surficial drainage for the Prefabricated Vertical Drains (PVDs) that will be installed at the locations shown on the Plans.

211.011 Materials

The following is added to Standard Specification Section 211:

The sand blanket material shall be clean, free draining bank-run or processed granular material without excessive fines content and consisting of hard, durable particles that is free of organic material, trash, snow, ice, frozen soil or other compressible material and shall be graded within the following limits:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieve
3-in.	100
¾-in.	95-100
#4	50-100
#16	20-85
#50	3-30
#100	0-7
#200	0-3

Gradation tests, whether completed by the Department or the Contractor, shall conform to AASHTO Method T27. The Contractor shall make their own arrangements for obtaining sand blanket material and shall submit a minimum of one grain size analysis to the Resident for review prior to the start of construction. Material shall not be imported to the site unless accepted by the Resident. The Contractor shall submit the following information:

- Location of the borrow source site(s).
- Present and past usage of the source site material.

- Gradation and moisture-density (AASHTO T27 and AASHTO T180) laboratory testing results of material sample(s).
- All previously existing report(s) associated with an assessment of the source site as related to the presence of oil or hazardous material.

If materials are suspected of containing oil and/or hazardous materials based on the Resident's review of the submitted data described above, the Contractor shall submit chemical test data on the material. The cost of any required chemical testing shall be borne entirely by the Contractor. The Resident will review the data and determine its acceptability for use on site.

The Department will collect additional samples from the same borrow source(s) for Acceptance Testing in accordance with Section 106.3.7. At a minimum the Department will collect and test samples at the following frequencies:

1. Area 1 (Sta. 51+00 to Sta. 82+00) – additional samples every approximately 5,000 cy
2. Area 2 (Sta.138+00 to Sta. 143+50) – one additional sample approximately halfway through drainage layer placement in Area 2
3. Area 4 (Sta. 179+25 to Sta. 186+00) –additional samples every approximately 5,000 cy

A minimum of 30 calendar days prior to the start of site work activities, the Contractor shall submit an Sand Blanket Quality Control Plan (QCP) to the Resident for review. The Contractor's QCP shall propose testing at a frequency no less than the frequency at which the Department plans to conduct Acceptance Testing (see above). The Department will perform Quality Control in accordance with the provisions of Section 106.4.

211.021 Embankment Construction - General

The following is added to Standard Specification Section 211:

The sand blanket shall be placed and compacted in the areas and to the minimum thicknesses shown on the Plans after clearing/subgrade preparation and settlement platform installation and initialization, and prior to the installation of PVDs.

The sand blanket material shall be placed in loose lifts and compacted to the minimum density as stated in Section 203 of the Standard Specifications.

The sand blanket material shall not be placed until the embankment subgrade has been inspected and approved by the Resident.

211.07 Method of Measurement

The following is added to Subsection 211.07 of the Standard Specifications:

The quantity of sand blanket for which payment will be made will be the number of Cubic Yards measured in place in accordance with the Plans and the Specifications and Special Provisions.

211.08 Basis of Payment

The following is added to Subsection 211.08 of the Standard Specifications:

The in-place quantity of sand blanket material, accepted by the Resident, will be paid for at the contract unit price per Cubic Yard. The unit price shall include but is not limited to furnishing the material and providing all labor, equipment, lab testing and incidentals necessary to place and compact the material at the locations and to the minimum thicknesses shown on the Plans.

Payment will be made as follows:

	Pay Item	Pay Unit
211.45	Sand Blanket	Cubic Yard

SPECIAL PROVISION
SECTION 304
AGGREGATE BASE AND SUBASE COURSE
(Alternate Material Option)

The Department has estimated Type D Aggregate Subbase Course – Gravel for use on this project. The Contractor may elect to utilize Type C Aggregate Base Course as an equal substitute. If the Type C option is utilized, it will meet the requirements of Standard Specification 304 and Special Provision 703 and the Department will execute a zero-dollar contract modification to switch from Item #304.10 to Item #304.16.

If the contractor elects to utilize Type D gravel, it will be placed full depth. Type E gravel will not be allowed in the lower lift.

SPECIAL PROVISION
SECTION 400
HOT MIX ASPHALT PAVEMENTS
(Hot Mix Asphalt Continuous Thermal Profiling)

Description The Contractor shall use a paver mounted continuous thermal profiler (CTP) to automatically measure, record and store the surface temperature of the HMA mat immediately behind the paver screed during all paving operations within the project traveled way. An infrared temperature measurement scanner shall be used to provide the thermal profile information including real time material temperatures and measurement locations. The system shall include a display that allows the field staff to view a continuous pavement surface temperature Contour Plot for Quality Control purposes.

The purpose is to demonstrate CTP technology, to evaluate the benefits and effectiveness of CTP technology for improving pavement quality and compaction processes, and to investigate how CTP data can be used as part of a performance specification. The CTP data will not be used for approval or rejection of the project materials. It is expected that the Contractor will utilize the CTP data as part of the project QC activities. The Contractor shall review the thermal profile results daily and shall discuss potential improvements to paving operations with the Department. The Department shall accept all pavement work under the existing Quality Assurance provisions as specified in Standard Specification 106 and Special Provision 401.

Definitions:

Contour Plot --- a graphic display of data using contour lines and/or color scales.
Distance Measuring Instrument (DMI) --- a sensor attached to a wheel on the paver to calculate distance and velocity.
Temperature Differential --- the difference between the statistical 98.5 percentile temperature and the statistical 1 percentile temperature within a thermal profile
Thermal Coverage (TC) --- the percent of the total coverage area, for the given pavement lift, where thermal profiling measurements (meeting the requirements of this special provision) are collected and stored.
Thermal profiles --- set of infrared temperature measurements behind the paver and across the entire mat width at maximum one foot intervals, evaluated in 150 foot sublots.
Traveled Way --- the portion of the roadway that is intended for the movement of vehicles, exclusive of shoulders and auxiliary lanes

I. Equipment Requirements

The Contractor shall purchase or lease a CTP for this pilot project and shall be responsible for the operation of the CTP including calibrating per the manufacturer's recommendations, providing an on-site individual for daily operation and data collection (start and stop locations, new lifts, etc.), data sharing with the Department and any other activities related to CTP. The manufacturer shall provide a technical representative to be on site to provide assistance during initial set up, pre-construction verification, and data management and processing, as needed during the project.

The scanner system shall be post mounted on the back of the paver and capable of taking thermal profile measurements within 10 feet of the back of the paver screed across the entire pavement width. Distance traveled, pavervelocity, and location and duration of paver stops shall be measured using a DMI and global positioning system during collection of the thermal profile. The thermal profile system shall function independently from the paving crew during normal paving operations.

All pavers used for traveled way paving must be instrumented. The field documentation system shall display in real time a contour plot of the thermal profiles, total distance travelled, paver speed and location in terms of station and/or GNSS coordinates. It shall provide real time statistical summaries of the thermal profiles, have the ability to manually export data using a removable media device and allow field staff to enter stations and the pavement lift currently being evaluated. The system shall support English units for distance in data incrementing or decrementing modes from a selected starting point and relate the longitudinal distance to any test point. The system may also report in station format. The CTP system shall also meet the requirements of Table 1 below:

TABLE 1: Continuous Thermal Profiler System Requirements

Parameter	Requirement
Longitudinal and Lateral Intervals Measurements	≤ 1-ft intervals---Tolerance of +/- 1 inch
Measurement Width	Driving travel lane paved in one (1) pass.
Infrared Temperature Scanner/Sensor	Range: 32°F to 480°F Accuracy: ± 3.6°F or ± 2.0% of the sensor reading, whichever is greater.
GPS	Accuracy of measurements on the HMA mat: ± 4 feet in the X and Y Direction

The CTP software shall meet the following requirements:

(1) Viewing/export software for analysis.

(2) The Manufacturer's Software and Storage must automatically collect, display, record, save, and analyze the mat temperature readings which include locations, paver starts, stops, and times during pavement placement. The software must also be able to export the thermal profile data meeting the requirements of Table 2:

TABLE 2: Thermal Profile Data Header Requirements

Item No.	Description	Example Data included in Header
1	Section Title	Highway 201
2	Machine Manufacture	ABC Company
3	Machine Model	Temp Scanner
4	Lateral Spacing between temperature measurements (inch)	Maximum of 12
5	Longitudinal Spacing between temperature measurements (inch)	Maximum of 12
6	Distance between the infrared temperature system scanner and hot mix asphalt mat (feet)	Variable

(3) The Manufacturer's software shall also provide the following items:

a.) Filtering by sensor/sensor location.

b.) Display through a map/graph---the thermal profile across the full pavement width and with respect to a defined segment/sublot length.

c.) Display the paver speed, and all paver stops (location and duration).

d.) Display total paving lengths and durations.
e.) Automatically determine the temperature differential of each thermal profile and allow the operator access to review the summary indices while maintaining continuous profile data collection.
f.) Automated thermal profile testing shall continue until the operator selects to stop data collection.

(4) The thermal profiling data must
a.) Be exportable as dbase ASCII (or Text Format) or directly into Veta.
b.) Have a time stamp of mapped and exported data (reflective of the time zone where the data is collected).
c.) Meet the requirements of Table 3 below:

TABLE 3: Required Fields for Each Data Point

Item No.	Date Field Name	Data Format Examples
1	Date Stamp (YYYYMMDD)	20160115
2	Time Stamp (HHMMSS.S -military format)	090504.0 (9 hr. 5 min. 4.0 s.)
3	Longitude (decimal degrees, with at least 6 significant digits)	69.765304
4	Latitude (decimal degrees, with at least 6 significant digits)	45.323573
5	Distance (feet)	1.0
6	Direction heading (degree angle, clockwise from the north)	45
7	Speed (ft/min)	30.0
8	Surface temp at each measurement location (ºF)	290

II. Construction Requirements

The CTP system will be installed and operated by the Contractor. The Contractor needs to ensure that there are no obstructions located in the infrared temperature scanner measurement area during paving operations. Field staff should also refrain from standing or working in the measurement area. However, if work is required in the measurement area to improve the pavement quality, it should be done in a timely manner and the field staff should provide the Department documentation of these critical work location(s).

The Department shall verify that the infrared scanner and GPS are functioning properly prior to work each day and at other times as needed. Thermal profiles will be collected on the travel lanes for the surface course. Thermal profile data shall be transferred directly from the CTP system removable media device to the Department and to the CTP software by the Contractor at the end of daily paving. The Contractor will inform the Department immediately when a CTP system failure occurs and provide a method and time to correct the deficiency. A CTP system failure is defined as any one of the following items:

1) The infrared scanner fails to function properly
2) The GPS unit fails to function properly

III. Reporting Requirements

The Contractor shall provide a report of thermal profile results to the Department by 1:00 PM on the day following paving, unless other arrangements are made with the Resident. The report shall contain the following information at a minimum:

1) Project WIN and town

2) Paving date, start time, and end time
3) Layer (base, intermediate, surface)
4) Item number
5) Beginning location and ending location
6) Total number of thermal profile sublots
7) Temperature distribution plot
8) Location and duration of each paver stop greater than 1 minute
9) Sublot number and beginning and ending location of each sublot categorized as either Moderate or Severe thermal segregation, as described in Table 4 below.

Each thermal profile sublot shall be categorized as Low, Moderate, or Severe by comparing the sublot Temperature Differential to the ranges listed in Table 4.

TABLE 4: Thermal Segregation Categories

Sublot Temperature Differential (°F)	**Thermal Segregation Category**
< 25.0	Low
25.0 to 50.0	Moderate
> 50.0	Severe

If two or more sublots in a day's paving are categorized as having Severe thermal segregation, the Contractor shall notify the Resident in writing of proposed corrective action.

IV. Method of Measurement

A pay adjustment shall be made for Thermal Coverage on the traveled way surface course. The Department will calculate the pay adjustment for the wearing surface thermal coverage using the criteria in Table 5.

TABLE 5: Pay Adjustment for Thermal Coverage

Thermal Coverage (%)	**Total Price Adjustment Wearing Course**
≥ 90	No Price Adjustment
< 90	Total Pay Adjustment = [(TC-90%)/(90%)] × Thermal Profile Unit Price where: TC = Thermal Coverage for the wearing course, % (reported to the tenth)

V. Basis of Payment

All costs will be paid for by the lump sum to include purchasing or leasing the equipment, collecting and providing the data to the Department and other items as described in this special provision.

Pay Item	Pay Unit
Item 401.10 - Hot Mix Asphalt Continuous Thermal Profiling	Lump Sum

SPECIAL PROVISION
DIVISION 400
PAVEMENTS

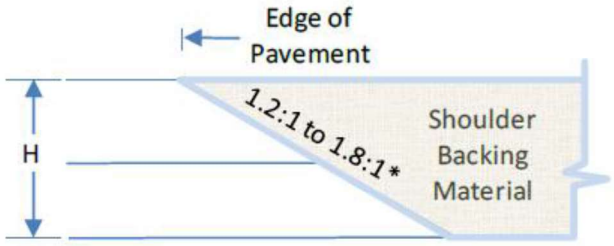
SECTION 401 - HOT MIX ASPHALT PAVEMENT
(Pavement Safety Edge)

Special Provision 400, Section 401 – Hot Mix Asphalt Pavement, subsection 401.13 – Spreading and Finishing, has been modified with the following revisions: All sections not revised by this Special Provision shall be as outlined in the Special Provision 400 Pavements, Section 401 – Hot Mix Asphalt Pavement. References to Standard Specifications, Special Provisions, or other documents, shall be determined as the most current version available at the time of bid, or as amended. All costs associated with this Item will not be paid for directly, but shall be considered included in the associated contract items.

401.13 – Spreading and Finishing The section has been amended as follows:

A manufactured Safety Edge device shall be used to form the edge of travel way or shoulder pavement surface to the dimensions shown in this special provision and at locations designated in the contract documents. The finished shape of the Safety Edge shall conform to the cross-section drawings shown in Detail A for newly constructed pavement sections, and Detail B for overlay sections.

Detail A



For H ≤ 5 in. Configuration 1

Newly constructed pavements - Top 3 to 4 inch surface and intermediate pavement course

Detail B

For H ≤ 5 in. Configuration 2

Overlay of existing pavement - surface course only

Equipment The Contractor shall use an approved longitudinal shoulder wedge system to create a sloped edge profile onto the roadway shoulder. The Contractor shall a shoulder wedge system that compacts the HMA and provides a sloped wedge equal to 32° plus or minus 5°, measured from the pavement surface cross slope extended. The use of a single plate strike off is not allowed.

The Contractor will utilize a shoulder wedge system that is adjustable, or can adjust to accommodate varying paving thicknesses.

All shoulder wedge systems to be used for the purpose of creating a Safety Edge must meet the approval of the Department. The Resident may require documentation that the system has been used on previous projects with acceptable results or may require a test section constructed prior to the beginning of work to demonstrate wedge shape and compaction to the satisfaction of the Engineer.

Construction Prior to placing hot mix asphalt pavement, the Contractor will prepare the shoulder material where the Safety Edge will be placed to provide support for the placement of the Safety Edge. This work will be in accordance with the Department's standard practice.

The pavement used to construct the Safety Edge shall be compacted utilizing the standard roller train used for HMA pavements and overlays. A pneumatic roller shall be used to seal the upper edge of the formed edge, without rolling off the edge. Pavement adjacent to the formed wedge shall be compacted in accordance with the owner agency construction joint specification.

In areas where it is not possible to place the Safety Edge in conjunction with mainline paving but the Safety Edge is designated (e.g., transitions at driveways, intersections, interchanges, etc.,) the Department may allow handwork for short sections.

Measurement and Payment The purchase of equipment, use of approved equipment, and construction of the Safety Edge will not be paid for directly, but shall be considered included in the contract per ton unit price for the related pavement item.

SPECIAL PROVISION
DIVISION 400
PAVEMENTS

SECTION 401 - HOT MIX ASPHALT PAVEMENT
(HMA Hamburg Wheel Tracker Specification)

401.03 Composition of Mixtures 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). Unless otherwise noted in Special Provision 403 - Hot Mix Asphalt Pavement, the design, verification, Quality Control, and Acceptance tests for this mix will be performed at 65 gyrations.

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}	25	19	12.5	9.5	4.75		
<3	≤90.5	96.0	≤98.0	13.0	14.0	15.0	16.0	16.0	65-80*	0.6-1.2
3 to <10	≤89.0									
≥ 10										

*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.

The Contractor shall submit for Department approval a JMF to the Asphalt Pavement Engineer for each mixture to be supplied. The JMF will be approved by the Department in accordance with the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual. 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 coarse aggregate stockpiles and 75 ton for fine aggregate stockpiles before the JMF may be submitted. The Contractor shall provide aggregate samples to the Department unless otherwise required. The Contractor shall also make available to the Department 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. 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 for a JMF as outlined in the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual: Mix Design Approval Section.

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 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. The cold feed percentage for RAP may be reduced up to 10 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 under any circumstances.

Before the start of paving, the Contractor shall provide the Department with eight boxes of plant produced HMA. The Contractor shall test its split of the sample and determine if the results meet the requirements of the Department's written policy for mix design verification (See MaineDOT Policies and Procedures for HMA Sampling and Testing). If the results are found to be acceptable, the Contractor will forward their results to the Department's Lab, which will test the Department's split of the sample. The results of the two split samples will be compared and shared between the Department and the Contractor. If the HMA meets the requirements for mix design verification, the mixture will be tested for rutting and moisture sensitivity in the Hamburg Wheel Tracker according to AASHTO T324, "Hamburg Wheel-Track Testing of Hot Mix Asphalt (HMA)." The sample will be required to meet the applicable requirements of Table 1A below for approval, depending on the PG binder grade required by the 403 Special Provision. If the sample meets the requirements of Table 1A, an approved JMF will be forwarded to the Contractor and paving may commence. The Department will have five business days from receipt of the sample at the Central Laboratory to process, test, and report the Hamburg Wheel Tracker sample. The first day's production shall be monitored, and the approval may be withdrawn if the mixture exhibits undesirable characteristics such as checking, shoving or displacement.

TABLE 1A: HAMBURG WHEEL TRACKER REQUIREMENTS

Specified PG Binder Grade	Test Temperature (°C)	Maximum Rut Depth (mm)	Minimum Number of Passes	Minimum Allowable SIP*
PG 64-28	45	12.5	20,000	15,000
PG 64E-28	48	12.5	20,000	15,000
PG 70E-28	50	12.5	20,000	15,000

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

401.19 Contractor Quality Control - Method A, B, C & D The following language has been added to Section 401.19:

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

TABLE 2A: MINIMUM QUALITY CONTROL FREQUENCIES

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

The Contractor shall sample the HMA on the first day of production and test the sample in the Hamburg Wheel Tracker according to AASHTO T324. This sample will not count towards the

minimum quality control frequency specified in Table 2A. The Contractor shall submit all Hamburg Wheel Tracker test reports in writing, signed by the appropriate technician and present them to the Department within ten working days of initial sampling, except when otherwise noted in the project specific QCP due to local restrictions. The Contractor shall make the raw Hamburg Wheel Tracker data from QC samples available to the Department upon request. If a QC sample fails to meet the criteria in Table 1A, the Contractor will be required to submit a corrective action letter to the Resident, Materials Engineer, Pavement Quality Manager, and Pavement Quality Engineer by the end of the following working day with the proposed changes to bring the mixture back into compliance. The Department will respond and either accept or reject the Contractor's proposed corrective action by the end of the following working day from when the letter was received.

401.20 & 401.21 Acceptance Method(s) A, B, C & D The following language has been added to Section(s) 401.20 & 401.21

The Department will sample the HMA on the first day of production and at the acceptance frequencies specified in Table 3 to verify the compliance with the Hamburg Wheel Tracker Requirements. If an acceptance sample fails to meet the criteria in Table 1A, the Contractor shall cease paving operations and submit a corrective action letter to the Resident, Materials Engineer, Pavement Quality Manager, and Pavement Quality Engineer by the end of the work day with the proposed changes to bring the mixture back into compliance. Failure to do so will be treated as a second incident under 106.4.6 QCP Non-compliance. The Department will only allow the continuation of paving operations when it is satisfied that the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production.

TABLE 3: MINIMUM ACCEPTANCE FREQUENCIES

Test or Action	Frequency
Hamburg Wheel Tracker	1 per 4,000 ton or at least once per Acceptance Lot

The Department may take additional informational samples and test the HMA to verify compliance with the Hamburg Wheel Tracker Requirements. If an informational sample fails to meet the criteria in Table 1A, the Contractor will be required to submit a corrective action letter to the Resident, Asphalt Pavement Engineer, Pavement Quality Manager, and Pavement Quality Engineer by the end of the following working day with the proposed changes to bring the mixture back into compliance. The Department will respond and either accept or reject the Contractor's proposed corrective action by the end of the following working day from when the letter was received.

401.201 & 401.211 Pay Adjustments Method(s) A, B, C & D The following language has been added to Section(s) 401.201 & 401.211

For items accepted under Method(s) A, B, C &D, if the mix is within the tolerances listed in Table 1A, the Department will pay the contract unit price, otherwise pay adjustments as shown in Table 4 shall be applied to the quantity of mix represented by the test.

TABLE 4: HWT PAY ADJUSTMENT

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

A pay adjustment will not be applied to the acceptance sample taken on the first day of production per JMF.

SPECIAL PROVISION
SECTION 401
HOT MIX ASPHALT PAVEMENT
(Material Transfer Vehicle)

Description The hot mix asphalt pavement for all leveling, base, binder and wearing courses shall be transferred to the paver by a material transfer vehicle (MTV) on mainline travelways, shoulders, and ramps as denoted in Special Provision 403 - Hot Mix Asphalt Pavement.

The MTV shall operate as an independent unit not attached to the paver. It shall be a commercially manufactured unit specifically designed to transfer the hot mix from haul trucks to the paver without depositing the mix on the roadway. A separate hopper with a capacity of 14 ton shall be inserted into the regular paver hopper. The MTV or the hopper insert shall be designed so that the mix receives additional internal mixing action either in the MTV unit or the paver hopper.

Basis of Payment The MTV and the hopper insert will not be paid for directly, but will be considered incidental to the related contract pay items.

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

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

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

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

Aggregates for HMA Pavement	703.07
HMA Mixture Composition	703.09

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

SPECIAL PROVISION
SECTION 401
HOT MIX ASPHALT PAVEMENT

401 HOT MIX ASPHALT LONGITUDINAL JOINT DENSITY

401.30 Description The Department will measure the pavement density of longitudinal joints constructed between adjoining travel lanes; turn lanes, truck (climbing) lanes, and passing lanes will be considered travel lanes for longitudinal join density testing unless otherwise noted in Section 403 – Hot Mix Asphalt Pavement. Core samples shall be tested according to AASHTO T-166. The Contractor shall cut 6-inch diameter cores at no additional cost to the Department by the end of the working day following paving. Pre-testing of the acceptance cores will not be allowed. If the Contractor and the Department mutually determine that a core is damaged, the Contractor shall cut new core(s) at the same offset and within 3 ft of the initial sample. The Contractor and the Department will mutually determine if underlying material is adhered to the core and if so will mark the core at the point where sawing is needed. The Department will place the cores in a secure container and the Contractor shall transport the cores to the designated MaineDOT lab. The cores will be saw cut by the Department to remove underlying layers. No recuts are allowed at a test location after the core has been tested.

For vertical longitudinal joints, cores shall be taken directly centered over the construction joint. For notch-wedge longitudinal joints , the cores shall be cut directly over the center of the tapered portion of the wedge.

As part of the project specific QCP, the Contractor shall include details as to methods of construction, rolling and compaction efforts, and action plan to adjust methods or equipment should the Quality level fall below 50 percent within limits. The Contractor shall be required to measure the joint density at randomly selected locations with a minimum frequency of one measurement per 750 linear feet. The Contractor shall have the option to cut calibration/verification cores at a rate not to exceed 1 per day.

If the Quality level for density falls below 50 percent within limits, the Contractor shall cease placement operations and submit a corrective action letter to the Department before proceeding with the Lot or before starting a new Lot. The Department will respond and either accept or reject the Contractor's proposed corrective action. If the Department accepts the corrective action, three stratified verification cores will be taken from the first 1500 foot section of longitudinal joint constructed for the purpose of evaluating the corrective action. These cores will be in addition to any Acceptance cores that may be designated in this area. The results from these cores shall be combined with the cores from the Lot in progress. Should the combined Quality level for density show an improvement, the Department will accept the corrective action and normal Acceptance sampling frequency shall resume. If an improvement has not been made to the combined Quality level for density, the Contractor shall cease production and submit an additional corrective action letter for consideration.

401.31 Acceptance This method utilizes Quality Level Analysis and pay factor specifications as described in Section 106. For Hot Mix Asphalt Pavement designated for acceptance under

Quality Assurance provisions, the Department will sample once per sublot on a statistically random basis, test, and evaluate in accordance with the following Acceptance Properties:

Lot size will be the entire length of longitudinal joint for the given HMA layer for the project, or equal Lots of a size agreed upon at the Pre-paving conference. The maximum sublot size shall be 2000 linear feet of longitudinal joint for density and the minimum number of sublots for any Lot shall be five. The Lot will be divided up into sublots of equal length. There shall be a separate Lot for each lift of HMA pavement, and Lots shall not be comprised of results from more than one HMA layer.

The Department will determine a pay factor using acceptance limits from Table 1.

TABLE 1: LONGITUDNAL JOINT DENSITY ACCEPTANCE LIMITS

PROPERTY	LSL
% TMD (In-Place Density)*	91.0%

* The Theoretical Maximum Density will be determined from the average of the G_{mm} values used to determine the percent compaction of the nearest acceptance cores on either side of the Longitudinal Joint Core from each adjacent mat.

The Department will calculate the Pay Adjustment for Longitudinal Joint Density as follows:

PA = (joint density PF- 1.0)(Q)(P) x0.40

Where

PA = Pay Adjustment
Q = Quantity of traveled way pavement represented by PF in tons
P = Contract price per ton
PF = Pay Factor

If the joint density Pay Factor is less than 0.88, the Pay Adjustment shall be:

PA = (-0.05)(Q)(P)

SECTION 401 - HOT MIX ASPHALT PAVEMENT

401.01 Description The Contractor shall furnish a uniformly blended, homogeneous mixture placed as one or more courses of Hot Mix Asphalt Pavement (HMA) on an approved base in accordance with the contract documents and in reasonably close conformity with the lines, grades, thickness, and typical cross sections shown on the plans or established by the Resident. The Department will accept this work under Quality Assurance provisions, in accordance with these specifications and the requirements of Section 106 – Quality, the provisions of AASHTO M 323 except where otherwise noted in sections 401 and 703 of these specifications, and the MaineDOT Policies and Procedures for HMA Sampling and Testing.

401.02 Materials 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

401.03 Composition of Mixtures The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), approved antistrip, warm mix additive, and/or mineral filler if required. HMA shall be designed and tested according to AASHTO R 35 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). Unless otherwise noted in Special Provision 403 - Hot Mix Asphalt Pavement, the design, verification, Quality Control, and Acceptance tests for this mix will be performed at 65 gyrations. TABLE 1: VOLUMETRIC DESIGN CRITERIA

Design ESAL's (Millions)	**Required Density (Percent of G_{mm})**			**Voids in the Mineral Aggregate (VMA) (Minimum Percent)**					**Voids Filled with Binder (VFB) (Minimum %)**	**Fines/Eff. Binder Ratio**
				Nominal Maximum Aggregate Size (mm)						
	$N_{initial}$	**N_{design}**	**N_{max}**	**25.0**	**19.0**	**12.5**	**9.5**	**4.75**		
< 3.0	≤90.5	96.0	≤98.0	13.0	14.0	15.0	16.0	16.0	65-80*	0.6-1.2
3 to <10	≤89.0									
≥ 10										

*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.

The Contractor shall submit a JMF to the Department for each mixture to be supplied. The JMF will be approved by the Department in accordance with the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual. 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 coarse aggregate stockpiles and 75 ton for fine aggregate stockpiles before the JMF may be submitted. The Contractor shall provide aggregate samples to the Department unless otherwise required. The Contractor shall also make available to the Department 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. 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 for a JMF as outlined in the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual: Mix Design Approval Section.
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 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. The cold feed percentage for RAP may be reduced up to 10 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 under any circumstances.

401.031 Warm Mix Technology The Contractor may place Hot Mix Asphalt Pavement produced with an accepted WMA technology if approved by the Department. Methods or technologies shall generally be at the Contractors option, but will be limited to proven, Agency and Industry accepted practice. Mixture production, placement and volumetric testing details, including temperatures, shall be included in the project specific QCP, and submitted to the Department for approval prior to any work.

401.04 Temperature Requirements The temperature of the mixture shall conform to the tolerances in Table 2 as measured at the truck at the mixing plant and at the paver unless otherwise authorized by the Department.

TABLE 2: ALLOWABLE TEMPERATURE RANGES

PGAB Grade(s)	**Temperature Range (°F)**
PG58-28 / PG64-28	275-325
PG64E-28 / PG70E-28	285-335

401.05 Performance Graded Asphalt Binder The Contractor shall utilize either a PG58-28, PG64-28, PG64E-28, PG70E-28, or other grade as specified in the 403 Special Provision. The Contractor shall utilize a PG64-28 if no liquid grade is specified within the 403 Special Provision.

401.06 Weather and Seasonal Limitations The State is divided into two paving zones as follows:

a. Zone 1 Areas north of US Route 2 from Gilead to Bangor and north of Route 9 from Bangor to Calais.
b. Zone 2 Areas south of Zone 1 including the US Route 2 and Route 9 boundaries.

TABLE 3: SEASONAL AND TEMPERATURE LIMITATIONS

Use	Minimum Ambient Air Temperature	Zone 1 Allowable Placement Dates	Zone 2 Allowable Placement Dates
Surface course (travelway & adjacent shoulders) less than 1 in. thick placed during conditions defined as "night work"	50°F	June 1 to Saturday following September 1	
Surface course (travelway & adjacent shoulders) less than 1 in. thick	50°F	May 15 to Saturday following September 15	
Travelway surface course greater than or equal to 1 in. thick	50°F	May 1 to Saturday following October 1	April 15 to Saturday following October 15
HMA for surface course on bridge decks	50°F	May 1 to Saturday following October 1	April 15 to Saturday following October 15
HMA for base or shim course on bridge decks	50°F	April 15 to November 15	
HMA for use other than travelway surface course	40°F	April 15 to November 15	
HMA for curb, driveways, sidewalks, islands, or other incidentals	40°F	N/A	N/A
HMA produced with an approved WMA technology for base or shim course	35°F	April 15 to November 15	

The ambient air temperature shall be determined by an approved thermometer placed in the shade at the paving location. Unless otherwise specified, the Contractor shall not place Hot Mix Asphalt Pavement on a wet or frozen surface regardless of the ambient air temperature. The Hot Mix Asphalt Pavement produced with an approved WMA technology shall meet the requirements of section 401.04 - Temperature Requirements, unless otherwise approved by the Department. For the purposes of this Section, the traveled way includes truck lanes, ramps, approach roads and auxiliary lanes.

401.07 Hot Mix Asphalt Plant

401.071 General Requirements HMA plants shall conform to AASHTO M 156, Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures with exception of Section 4.2.1, 4.2.2, 4.3.4, 4.3.5, and 4.12.2.

All HMA plants will be inspected annually by the Department prior to producing HMA for Department projects. The Contractor shall provide the Department at least 72 hours' notice that the plant is ready for inspection. The Contractor shall equip the plant with ladders and platforms that are accessible and safe to obtain samples of PGAB, aggregate and mix from the relevant tanks, collector belts and haul units. Silo storage time of mixtures shall not exceed 36 hours.

401.072 Stockpiles The Contractor shall provide sufficient space for stockpiles and maintain a minimum of supply for 2 days production of all aggregate products used in MaineDOT approved mix designs currently under production. A minimum stockpile supply of 100 ton (70 yards) shall be maintained at all times. The Contractor shall construct stockpiles to prevent intermingling and to

minimize segregation. All stockpiles used in MaineDOT mixes shall be identified with weatherproof signs at least 12" high and 24" wide, with reflective lettering at least 2" high.

401.073 Cold Feeds Cold Feed Bins will have bin dividers to keep aggregate products separated. Adequate means must be provided for obtaining samples of the combined flow of all Cold feed bins.

401.074 Dryer Dryer shall be capable of heating aggregate to required mixing temperature and shall be in good operation and condition. Dryer shall be subject to annual inspection prior to start-up. The Contractor shall dry and heat the aggregates for the HMA to the required temperature, adjusting flames to avoid damaging the aggregates. The Contractor shall provide the Department a minimum period of 72 hours to inspect the dryer and provide at least 24 hours' notice that the dryer is ready for inspection.

401.075 Asphalt Binder The plant shall include a heating system and insulation to maintain the asphalt binder at a uniform temperature for proper mixing and compaction. A thermometer shall be provided in the asphalt binder line. No direct flame may come in contact with tank. A sampling valve shall be provided in the circulation line downstream of any binder additive used unless otherwise approved by the Department. The Contractor shall drain down the asphalt as low as safely possible in any tank that will be switched to a new source or grade prior to adding the new PGAB.

401.076 Additives Additives (WMA, anti-strip, etc.) introduced into the binder at the HMA plant shall be introduced per the supplier's recommendations and shall be approved by the Department. The system for introducing additives shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all production rates and batch sizes. Additive introduction systems shall be controlled by a proportioning device to the amount required on the JMF plus or minus 0.1% of the target. Additive introduction systems shall
be interlocked with the plant and the recordation (batch tickets or drum recordation) shall display the additive and the weight and percentage added. A means for sampling the PG binder with additive introduced will be provided. The sampling point shall be after the additive is mixed with the PGAB before entering the drum or mixer unit.

401.077 Batch Plants

Hot Bins Hot bins shall provide uniform continuous operation and be in good working condition. The plant shall be able to provide samples of hot bins upon request. Overflow shall be provided for each hot bin. Hot bin gates shall close without leaking. Bin walls must prevent intermingling between bins. Each hot bin shall have low level indicators which will alert the operator when the bin is empty.

Mixer Unit Clearance between blades and liner shall be 1" maximum, unless the aggregate exceeds 1 ¼" then the clearance shall be 1 ½". The spray bar length shall be at least 75% of the mixer length. The mixer unit shall be a twin pug mill-type mixer capable of mixing continuously for at least 45 seconds after all materials have been introduced into the mixer. The blades in the mixer shall be capable of producing a homogenous mixture. If the mixer is not enclosed, it shall be equipped with an adjustable hood to prevent loss of dust by dispersion. The mixer unit shall be subject to annual inspection prior to removal of safety features and being readied for service. The Contractor shall provide the Department the opportunity to inspect the mixer unit prior to the annual inspection. The Contractor shall provide the Department a minimum period of 72 hours to inspect the mixer unit and provide at least 24 hours' notice that the mixer unit is ready for inspection.

Mineral Filler Mineral filler and fiber shall utilize separate bins and feed systems to store and proportion the required quantity into the mixture. The feed systems shall be accurate to no more than 10% of the required weight with a convenient and accurate means of calibration. Mineral filler and fiber shall be introduced in the weigh hopper and uniformly distributed prior to the injection of the asphalt binder.

Automation The HMA batch plant shall automatically batch, mix and discharges mixes. The batch plant shall accurately proportion the various materials in the proper order by weight. The entire batching and mixing cycle shall be continuous and shall not require any manual operations. The batch plant shall use auxiliary interlock circuits to trigger an audible alarm whenever an error exceeding the acceptable tolerance occurs. Along with the alarm, the printer shall print an asterisk on the delivery slip in the same row containing the out-of-tolerance weight. The automatic proportioning system shall be capable of consistently delivering material within the full range of batch sizes. When RAP is being used, the plant must be capable of automatically compensating for the moisture content of the RAP.

The HMA batch plant shall be operated within the following tolerances:

Each aggregate component	+/- 1.5% cumulative, per bin
Mineral Filler	+/- 0.5%
Bituminous Material	+/- 0.1%
Zero return (aggregate)	+/- 0.5%
Zero Return (AC)	+/- 0.1%
Additives	+/- 0.1%

Recordation All plants shall be equipped with an approved digital recording device. The printer shall mark any weight on the ticket that exceeds tolerance. The delivery slip shall contain information required under Section 108.1.3 - Provisions Relating to Certain Measurements, Mass and paragraphs a, b, and c of Section 401.078.

401.078 Drum Plants

Cold Feeds and Delivery System A scalper screen shall be used to remove oversize material. The accuracy of the belt scale shall be within +/- 1.0% of the actual weight being measured. The plant shall be capable of correcting for aggregate moisture. Mineral filler and fiber shall utilize separate bin(s) and feeder systems to store and proportion the required quantity into the mixture. The feed systems shall be accurate to no more than +/- 10% of the required weight with a convenient and accurate means of calibration. The plant shall be equipped with a single control to change all feed rates. Mineral filler and fiber shall be introduced such that dry mixing is accomplished no less than 18 inches prior to the injection of the asphalt binder. The Contractor shall ensure that the mineral filler does not become entrained in the exhaust stream of the dryer.

Binder System The flow of asphalt binder shall adjust automatically with dry aggregate weights. The Department will conduct an asphalt flow meter check annually and after each change of plant location. The flow meter check must be performed prior to producing mix for Department projects. The plant must be configured to provide a convenient means to check accuracy of the flow meter. The flow meter will be considered accurate if the measured weight is within 1% of actual weight.

Drum Mixer The plant shall be equipped with a diversion system where mix can be diverted at startup/shutdown and any time. The drum mixer shall be subject to annual inspection prior to removal of safety features and being readied for service. The Contractor shall provide the Department a minimum period of 72 hours to inspect the drum mixer while providing at least 72 hours' notice that the drum mixer is ready for inspection.

Recordation An approved automatic ticket printer system shall be used to print delivery slips. The requirements for delivery slips for payment of materials measured by weight, as given in the following Sections, shall be waived: 108.1.3 a., 108.1.3 b., 108.1.3 c., and 108.1.3 d. The automatic printed ticket will be considered as the Weight Certificate. The dry aggregate weights and binder flow shall be recorded as well as mineral filler and all binder additives. The recordation of materials shall be printed a minimum of every ten minutes while in production.

The requirements of Section 108.1.3 f. - Delivery Slips, shall be met by the delivery slip printed by the automatic system, which accompanies each truckload, except for the following changes:

a. The quantity information required shall be individual weights of each batch or total net weight of each truckload.
b. Signatures (legible initials acceptable) of Weighmaster (required only in the event of a malfunction as described in 401.074 c.).
c. The MaineDOT designation for the JMF.

401.079 Scales and Weight Checks Scales shall meeting the requirements of Section 108 - Payment. The scales shall be inspected and sealed by the State Sealer (or approved alternative) as often as the Department deems necessary to verify their accuracy. Plant scales shall be checked prior to the start of the paving season, and each time a plant is moved to a new location. Subsequent checks will be made as determined by the Resident. The Contractor will have at least ten 50 pound masses for scale testing at batch plants. At Contractor's option, the Contractor can use one single test weight that has been checked on sealed scales. This weight shall be 1,000 lbs. or greater. At least twice during each 5 days of production either of the following checks will be performed:

a. A loaded truck may be intercepted and weighed on a platform scale that has been sealed by the State Sealer of Weights and Measures within the past 12 months. The inspector will notify the producer to take corrective action on any discrepancy over 1.0%. The producer may continue to operate for 48 hours under the following conditions.

1. If the discrepancy does not exceed 1.5%; payment will still be governed by the printed ticket.
2. If the discrepancy exceeds 1.5%, the plant will be allowed to operate as long as payment is determined by truck platform scale net weight.

If, after 48 hours the discrepancy has not been addressed and reduced below 1.0%, then plant operations will cease. Plant operation may resume after the discrepancy has been brought within 1.0%.

b. Where platform scales are not readily available, a check will be made to verify the accuracy and sensitivity of each scale within the normal weighing range and to assure that the interlocking devices and automatic printer system are functioning properly. If platform scales are not readily

available, a weight with a known mass-verified and sealed annually by a licensed scale company, may be used by hanging weight from silo or surge hopper, at lower middle and upper third levels upon request to verify scale accuracy.

d. In the event of a malfunction of the automatic printer system, production may be continued without the use of platform truck scales for a period not to exceed the next two working days, providing total eights of each batch are recorded on weight tickets and certified by a Licensed Public Weighmaster.

401.08 Hauling Equipment Units hauling HMA shall have tight, clean, and smooth metal bodies, which have been thinly coated with a small amount of approved release agent to prevent the mixture from adhering to the bodies. Release agents that dissolve or strip asphalts, including diesel fuel, will not be allowed.

All mix haul units shall have a cover of water repellent material capable of heat retention, which completely covers the mixture. The cover shall be securely fastened on the truck, unless unloading. Haul units shall have an opening on both sides near the midpoint of the body, at least 12 in above the bed, which will accommodate a thermometer stem.

401.09 Pavers The Contractor shall use pavers meeting the requirements of this section unless otherwise authorized by the Department. Pavers shall meet the requirements of Table 4: Paver Requirements.

TABLE 4: PAVER REQUIREMENTS

Use	Paver Requirement
Traveled Way & Auxiliary Lanes	Equipped with a 10 ft minimum main screed with activated extensions. The minimum tractor weight shall be 30,000 pounds.
	Equipped with automatic grade and slope controls that automatically adjust the screed and increase or decrease the layer thickness to compensate for irregularities in the preceding course. The controls shall maintain the proper transverse slope and be readily adjustable so that transitions and superelevated curves can be properly paved. The controls shall operate from a fixed or moving reference such as a grade wire or ski type device (floating beam) with a minimum length of 30 ft, a non-contact grade control with a minimum span of 24 ft, except that a 40 ft reference shall be used on interstate and divided highway projects.
All HMA Placement	Self-contained, self-propelled units of sufficient class and size to place Hot Mix Asphalt Pavement in full lane widths specified in the contract on the main line, shoulder, or similar construction.
	Equipped with a free-floating activated heated main screed with activated extensions. Pavers with extendible screeds shall have auger extensions and tunnel extenders as per the manufacturer's recommendations, a copy of which shall be available if requested.
	Equipped with a receiving hopper with sufficient capacity for a uniform spreading operation and a distribution system to place the mixture uniformly, without segregation in front of the screed.
	Operated in such a manner as to produce a visually uniform surface texture and a thickness within the requirements of Section 401.11 - Surface Tolerances. The screed assembly shall produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

The Contractor shall have the paver at the project site sufficiently before the start of paving operations to be inspected and approved by the Department. The Contractor shall repair or replace any paver found worn or defective, either before or during placement, to the satisfaction of the Department. Pavers that produce an unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA on MaineDOT projects. On a daily basis, the Contractor shall perform density testing across that mat as detailed in Section 401.191 Quality Control - Method A, B & C.

401.10 Rollers Rollers shall be static steel, pneumatic tire, oscillatory, or approved vibrator type. Rollers shall be in good mechanical condition, capable of starting and stopping smoothly, and be free from backlash when reversing direction. Rollers shall be equipped and operated in such a way as to prevent the picking up of hot mixed material by the roller drums or tires. Crushing of the aggregate or displacement of the HMA during rolling will not be permitted. Any HMA Pavement that becomes loose, broken, contaminated, shows an excess or deficiency of PGAB, or is in any other way defective shall be removed and replaced at no additional cost with fresh material which shall be immediately compacted to conform to the adjacent area.

The Contractor shall repair or replace any roller found to be worn or defective, either before or during placement, to the satisfaction of the Department. Rollers that produce grooved, unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA. The type of rollers to be used and their relative position in the compaction sequence shall generally be the Contractor's option unless otherwise specified in the contract, provided specified density is attained and with the following requirements:

a. On variable-depth courses, the first lift of pavement over gravel, reclaimed pavement, on irregular or milled surfaces, or on bridges, at least one roller shall be 16 ton pneumatic-tired. Pneumatic-tired rollers shall be equipped with skirting to minimize the pickup of HMA materials from the paved surface. When required by the Resident, the roller shall be ballasted to 20 ton.
b. Compaction with a vibratory or steel wheel roller shall precede pneumatic-tired rolling, unless otherwise authorized by the Department.
c. Vibratory rollers shall not be operated in the vibratory mode on bridge decks.
d. Any method, which results in cracking or checking of the mat, will be discontinued and corrective action taken.
e. The use of an oscillating steel roller shall be required to compact all mixtures placed on bridge decks.

The maximum operating speed for a steel wheel or pneumatic roller shall not exceed the manufacturer's recommendations, a copy of which shall be available if requested.

401.11 Surface Tolerances The Department will check the following surface tolerances:

a.) Longitudinally: The pavement surface profile shall be free of deviations in excess of +/- ¼ inches from the required pavement surface profile grade. To verify the surface tolerance a straight plane shall be established using 16 foot straight edge or a taught string line placed parallel to the direction of travel and checked continuously across the width of the lane.
b.) Transversely: The pavement surface profile shall be free of deviations in excess of 0 inches below and ¼ inches above the required cross-sectional profile grade. To verify the surface tolerance a straight plane shall be established using a 10 foot straight edge or taught string line

placed perpendicular to the direction of travel and checked continuously along the length of the lane.

The Contractor shall correct defective areas by removing defective work and replacing it with new material as directed by the Department. The Contractor shall furnish a 10 foot straightedge for the Department's use.

401.12 Preparation of Existing Surface The Contractor shall thoroughly clean the surface upon which Hot Mix Asphalt Pavement is to be placed of all objectionable material. When the surface of the existing base or pavement is irregular, the Contractor shall bring it to uniform grade and cross section. All surfaces shall have a tack coat applied prior to placing any new HMA course. Tack coat shall conform to the requirements of Section 409 – Bituminous Tack Coat, Section 702 – Bituminous Material, and all applicable sections of the contract.

401.13 Spreading and Finishing On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the Contractor shall spread, rake, and lute the HMA with hand tools to provide the required compacted thickness. Release agents that dissolve or strip asphalts, including diesel fuel, will not be allowed. On roadways with adjoining lanes carrying traffic, the Contractor shall place each course per the conditions in Table 5, unless otherwise noted by the Department in Section 403 - Hot Mix Asphalt Pavement.

TABLE 5: PLACEMENT CONDITIONS FOR ADJOINING LANES

Depth (at centerline)	**Placement Conditions**
Vertical Longitudinal Joint	
¾" and less (incl. shim)	The Contractor may place the HMA course over the full single travel lane width for each production day.
1" to 1 ¼"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before weekend or holiday suspension.
1 ½" to 2"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before the end of the following calendar day.
Greater than 2"	The Contractor shall place each course over the full width of the traveled way section being paved that day.
Notched-Wedge Longitudinal Joint	
1 ½" to 2"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before weekend or holiday suspension. A maximum unmatched centerline joint length of 0.5 miles will be permitted over the weekend.
Greater than 2"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before the end of the following calendar day.

The Contractor shall place the specified course over the full width of the mainline traveled way being paved, regardless of use, depth, or longitudinal joint type prior to Memorial Day, July 4th, Labor Day, paving suspensions exceeding three days, or other dates as specified by special provision.

The Contractor shall install additional warning signage that clearly defines the centerline elevation differential hazard. Unless otherwise addressed in the contract, the Contractor shall install additional centerline delineation such as a double application of raised pavement markers at 100 foot intervals, or temporary painted line. For any exposed vertical edge between the shoulder and traveled way, at a minimum, the use of temporary painted line, or RPMs placed along the edge of traveled way at 200 foot intervals is required. The Traffic Control Plan shall be amended to include this option and the additional requirements. All signs and traffic control devices will conform to Section 719.01, and Section 652, and will be installed prior to the work, at a maximum spacing of 0.50 mile for the entire length of effected roadway section. If this option is utilized, all additional signing, labor, traffic control devices, or incidentals will not be paid for directly, will be considered incidental to the appropriate 652 items.

401.14 Hot Mix Asphalt Placement on Bridge Decks Hot mix asphalt pavement placed on bridges shall also conform to Section 508.04 and the following requirements.

a. The minimum production and placement temperature for the Hot Mix Asphalt placed over membrane shall conform to the manufacturer's recommendations.
b. The bottom course shall be placed with an approved rubber mounted paver of such type and operated in such a manner that the membrane waterproofing will not be damaged in any way.
c. The top course shall not be placed until the bottom course has cooled sufficiently to provide stability.
d. The Contractor will not be required to cut sample cores from the compacted pavement on the bridge deck, unless otherwise directed by Special Provision.
e. After the top course has been placed, the shoulder areas shall be sealed 3 ft wide with two applications of an emulsified bituminous sealer meeting the requirements of Section 612.03 – Sealing and Section 702.12 - Emulsified Bituminous Sealing Compound. The first application shall be pre-mixed with fine, sharp sand, similar to mortar sand, as needed to fill all voids in the mix in the area being sealed. The second application may be applied without sand. The sealer shall be carried to the curb at the gutter line in sufficient quantity to leave a bead or fillet of material at the face of the curb. The area to be sealed shall be clean, dry and the surface shall be at ambient temperature. The furnishing and applying of the required quantity of sealer for the bridge shoulder areas shall be incidental to placing the hot mix asphalt pavement.
f. The area between the edge of the membrane and the vertical surface shall be completely sealed with hot-applied rubberized asphalt material, meeting the requirements of Type 4 crack seal; shall be applied to form a complete seal between the membrane and the vertical surface and shall extend up the vertical surface to within ½ inch of the top of the HMA wearing surface. This work shall be considered incidental to the contract pavement items unless 508 membrane items are included in the contract.

401.15 Compaction Immediately after the Hot Mix Asphalt Pavement has been spread, struck off, and any surface irregularities adjusted, the Contractor shall thoroughly and uniformly compact the HMA by rolling.

The Contractor shall roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving. The Contractor shall prevent adhesion of the HMA to the rollers or vibrating compactors without the use of fuel oil or other petroleum-based

release agents. Solvents designed to strip asphalt binders from aggregates will not be permitted as release agents on equipment, tools, or pavement surfaces.

The Contractor shall immediately correct any displacement occurring as a result of the reversing of the direction of a roller or from other causes to the satisfaction of the Department. Any operation other than placement of variable depth shim course that results in breakdown of the aggregate shall be discontinued. Any new pavement that shows obvious cracking, checking, or displacement shall be removed and replaced for the full lane width as directed by the Resident at no cost to the Department.

Along forms, curbs, headers, walls, and other places not accessible to the rollers, the Contractor shall thoroughly compact the HMA with mechanical vibrating compactors. The Contractor shall only use hand tamping in areas inaccessible to all other compaction equipment. On depressed areas, the Contractor may use a trench roller or cleated compression strips under a roller to transmit compression to the depressed area.

Any HMA that becomes unacceptable due to cooling, cracking, checking, segregation or deformation as a result of an interruption in mix delivery shall be removed and replaced with material that meets contract specifications at no cost to the Department.

For all items requiring pavement density testing, the Contractor shall cut 6-inch diameter cores at no additional cost to the Department by the end of the working day following paving. Cores shall be cut such that the nearest edge at least 9 inches from any joint. Pre-testing of the cores will not be allowed. If the Contractor and the Department mutually determine that a core is damaged, the Contractor shall cut new core(s) at the same offset and within 3 ft of the initial sample. The Contractor and the Department will mutually determine if underlying material is adhered to the core and if so will mark the core at the point where sawing is needed. The Department will place the cores in a secure container and the Contractor shall transport the cores to the designated MaineDOT lab. The cores will be saw cut by the Department to remove underlying layers. No recuts are allowed at a test location after the core has been tested.
On all sections of overlay with wearing courses designed to be 1 in or less in thickness, there shall be no pay adjustment for density otherwise noted in Section 403 - Hot Mix Asphalt Pavement. For overlays designed to be 1 in or less in thickness, density shall be obtained by the same rolling train and methods as used on mainline travelway surface courses with a pay adjustment for density, unless otherwise directed by the Department.

There shall be no pay adjustment for density on shoulders unless otherwise noted in Section 403 - Hot Mix Asphalt Pavement. Density for shoulders shall be obtained by the same rolling train and methods as used on mainline travelway, unless otherwise directed by the Department. Efforts to obtain optimum compaction will not be waived by the Department unless it is apparent during construction that local conditions make densification to this point detrimental to the finished pavement surface course.

401.16 Joints The Contractor shall construct wearing course transverse and longitudinal joints in such a manner that minimum tolerances shown in Section 401.11 - Surface Tolerances are met when measured with a straightedge. The paver screed shall maintain a uniform head of HMA during transverse and longitudinal joint construction. The HMA shall be free of segregation and meet temperature requirements outlined in Section 401.04. Transverse joints of the wearing course shall

be straight and neatly trimmed. The Contractor may form a vertical face exposing the full depth of the course by inserting a header, by breaking the bond with the underlying course, or by cutting back with hand tools. The Contractor shall apply a coating of emulsified asphalt immediately before paving all joints to the vertical face and 3 in of the adjacent portion of any pavement being overlaid except those formed by pavers operating in echelon. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. The Department may approve application by a brush for small surfaces, or in the event of a malfunction of the spray apparatus, but for a period of not more than one working day.

Where pavement under this contract joins an existing pavement, or when the Department directs, the Contractor shall cut the existing pavement along a smooth line, producing a neat, even, vertical joint. The Department will not permit broken or raveled edges. The cost of all work necessary for the preparation of joints is incidental to related contract pay items. Longitudinal joints shall be generally straight to the line of travel and constructed in a manner that best ensure joint integrity. Methods or activities that prove detrimental to the construction of straight, sound longitudinal joints will be discontinued.

The Contractor may utilize an approved notched wedge joint device on all HMA layers 1 ½ inches in depth or greater. A notched wedge joint shall be constructed as shown in Figure 1 using a device that is attached to the paver screed and is capable of independently adjusting the top and bottom vertical notches.

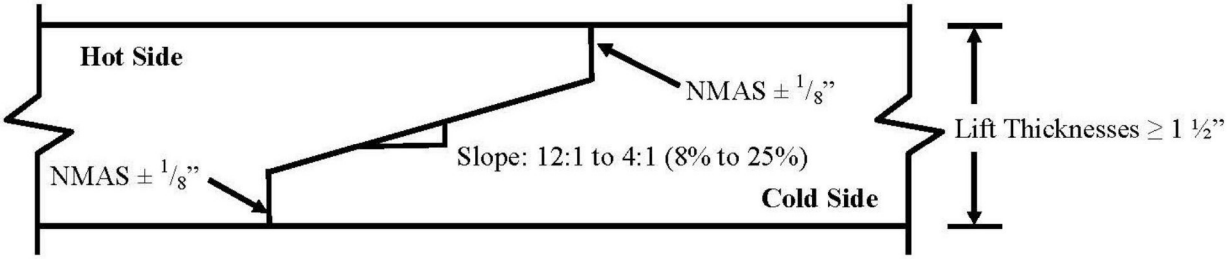


FIGURE 1: Notched Wedge Joint

Notes

1. An emulsified tack coat shall be applied to the vertical edges and the wedge surface so that the total rate is 0.05 G/SY plus the normal specified rate prior to placing the adjacent layer. The Contractor may elect to apply the emulsified tack coat in one or multiple passes.
2. Dimensions shown are compacted depths (after rolling is complete).

The Department reserves the right to have centerline cores cut by the Contractor's QC personnel for informational purposes to monitor the density along the joint. Informational cores at the centerline joint will be taken centered over the tapered part of the wedge joint.

Any notched wedge joint constructed areas that become cracked or broken shall be trimmed back to the limits affected prior to placing the adjoining lane. Any materials that become unbound or separated from the wedge or tapered joint section, or contaminated by materials determined by the Department as being detrimental to the construction of a sound construction joint, shall be removed by sweeping, compressed air and lance, or by hand tools as required. This work, if necessary, will not be paid for directly, but shall be considered incidental to the related contract items.

The Contractor shall apply a coating of emulsified asphalt on the vertical and tapered surface of the longitudinal centerline joint immediately before paving if the notched wedge joint device is used.

The total rate of application shall be 0.050 G/SY plus the normal specified tack coat rate. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. The Department may approve application by a brush for small surfaces.

401.17 Hot Mix Asphalt Documentation The Contractor and the Department shall agree on the amount of Hot Mix Asphalt Pavement that has been placed each day. All delivery slips shall conform to the requirements of 401.078.

401.18 Prepave Meeting Prior to placing any mix, the Department and the Contractor shall hold a Pre-paving conference to discuss the paving schedule, source of mix, type and amount of equipment to be used, sequence of paving pattern, rate of mix supply, random sampling, project lots and sublots and traffic control. A copy of the density QC random numbers to be used on the project shall be provided to the Resident. The Departments' random numbers for Acceptance testing shall be generated and on file with the Resident and the Project Manager. All personnel of the Department and the Contractor who have significant information relevant to the paving items shall attend, including the responsible onsite paving supervisor for the Contractor. The Resident will prepare minutes of the conference and distribute them to all attendees. Any requests to revise the minutes must be made to the Resident within 7 Days of Receipt. These minutes will constitute the final record of the Pre-paving conference. On the first day of paving and whenever there is a change in the onsite paving foreman or paving inspector, the Department and the Contractor shall hold an informal onsite meeting to review the minutes of the Pre-paving conference, Project Specific QCP, Plans, Typicals, Special Provisions and communication process. This meeting shall be held prior to placing any mix. The onsite paving supervisor, QCT, Superintendent, Resident and/or paving inspector shall attend.

401.19 Contractor Quality Control – Method A, B, C & D
The Contractor shall operate in accordance with the approved Quality Control Plan (QCP) to assure a product meeting the contract requirements. The Contractor shall not begin paving operations until the Department approves the QCP in writing.

401.191 Quality Control The QCP shall meet the requirements of Section 106.6 - Acceptance and this Section. The QCP shall address any items that affect the quality of the Hot Mix Asphalt Pavement, and shall include the following personnel meeting these minimum requirements:

a. QCP Administrator - The QCP Administrator must be a full-time employee of or a consultant engaged by the Contractor or paving subcontractor. The QCP Administrator shall have full authority to institute any and all actions necessary for the successful operation of the QCP. The QCP Administrator (or their designee in the QCP Administrator's absence) shall be available to communicate with the Department at all times.

- For items accepted under Methods A and B, the QCP Administrator shall be certified as a Quality Assurance Technologist (QAT) by NETTCP.
- For items accepted under Methods C and D, the QCP Administrator shall be certified by NETTCP as a Quality Assurance Technologist (QAT), Plant Technician, or Paving Inspector.

b. Process Control Technician(s) (PCT) shall utilize test results and other quality control practices to assure the quality of aggregates and other mix components and control proportioning to meet the JMF(s). The PCT shall inspect all equipment used in mixing to assure it is operating

properly and that mixing conforms to the mix design(s) and other Contract requirements, and that delivery slips and plant recordation accurately reflects the mix being produced with all the required information. The QCP shall detail how these duties and responsibilities are to be accomplished and documented, and whether more than one PCT is required. The Plan shall include the criteria to be utilized by the PCT to correct or reject unsatisfactory materials. The PCT shall be certified as a Plant Technician by the NETTCP.

c. Quality Control Technician(s) (QCT) shall perform and utilize quality control tests at the job site to assure that delivered materials meet the requirements of the JMF(s). The QCT shall inspect all equipment utilized in transporting, laydown, and compacting to assure it is operating properly and that all laydown and compaction conform to the Contract requirements. The QCP shall detail how these duties and responsibilities are to be accomplished and documented, and whether more than one QCT is required. The QCP shall include the criteria utilized by the QCT to correct or reject unsatisfactory materials. The QCT shall be certified as a Paving Inspector by the NETTCP.

The QCP shall detail the coordination of the activities of the Plan Administrator, the PCT and the QCT. The Project Superintendent shall be named in the QCP, and the responsibilities for successful implementation of the QCP shall be outlined.

The QCP shall address any items that affect the quality of the Hot Mix Asphalt Pavement including, but not limited to, the following:

a. General Requirements:
    - Job Mix Formulas (JMFs)
    - Name of QCP Administrator, and certification number
    - Description of corrective action process
    - Disposition of defective material
    - A procedure to take immediate possession of acceptance samples once released by MaineDOT and deliver said samples to the designated acceptance laboratory.

b. Process Control Requirements: Each Hot Mix Asphalt plant shall have a Plant Specific Process Control Plan. At minimum the plan shall include:
    - Name of Plant Specific Process Control Technician(s) and certification number(s)
    - Hot mix asphalt plant details
    - Stockpile Management
    - Mixing & transportation
    - Silo management and details
    - A detailed description of RAP processing, stockpiling and introduction into the plant
    - PG Binder management:
        - Tanks and storage (including polymer modified binders if applicable)
        - Binder temperature
        - Sample points
        - Method to ensure mixture contains the specified binder grade
        - Additive introduction details if introduced at the plant
    - Testing and inspection plan for control of aggregates and RAP
    - Mix Testing and inspection plan

c. Quality Control Requirements – Method A & B
   - Name of Quality Control Technicians(s) and certification number(s)
   - Laydown operations
   - Longitudinal joint construction including the tacking of all joints.
   - Procedures for avoiding paving in inclement weather
   - Compaction of shoulders
   - Methods to ensure that segregation is minimized
   - Procedures to determine the maximum rolling and paving speeds based on best engineering practices and past experience in achieving acceptable pavement smoothness.
   - Sequence for paving around drainage structures, under guard rail, around curb, at bridges, intersections, drives and minor approaches to ensure proper compaction, finish, and drainage.
   - Type of release agent to be used on haul units, tools and rollers.

d. Quality Control Requirements – Method C and D
   - Name of QCP Administrator and certification number(s) as specified in Section 401.19.
   - Name of Process Control Technicians(s) and certification number(s).
   - Name of Quality Control Technicians(s) and certification number(s).
   - Anticipated Compaction Temperature Zones for each roller pass during placement.
   - Mix TMD to be used for density gauge setting for method spec density work
   - Procedures for avoiding paving in inclement weather.
   - Type of release agent to be used on haul units, tools and rollers.
   - A note stating that the use of petroleum-based fuel oils, such as diesel or kerosene, or asphalt stripping solvents will not be permitted.
   -

The Contractor shall also supply a Laydown Operation Plan that addresses sequence of work, layout of work, longitudinal joint construction, compaction of shoulders, methods to minimize segregation, and procedures to achieve acceptable pavement smoothness.

For each production day, a summary of each day's results, including a daily paving report, summarizing the mixture type, mixture temperature, equipment used, environmental conditions, and the number of roller passes, shall be recorded and signed by the QCT and presented to the Department's representative by 1 PM the following working day.

Unless otherwise noted in Section 403 - Hot Mix Asphalt Pavement, the Contractor shall submit a modified QC Plan detailing, how the mix is to be placed, what equipment is to be used, and what HMA plant is to be used for Items covered under the Plan. All mix designs (JMF) shall be approved and verified by MaineDOT prior to use.
A QCP, certified QC personnel, and a Prepave Meeting shall not be required for Item 403.209 - Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (sidewalks, drives, islands & incidentals) accepted under visual or Method D. An approved JMF shall be provided to the Resident prior to placement.

The Contractor shall certify the mix and the test results for each item by a Certificate of Compliance.

The Contractor shall have a testing lab at the plant site, equipped with all testing equipment necessary to complete the tests in Table 6. The Contractor shall generate QC sampling random numbers for each approved mix design. A copy of the random numbers shall be emailed to the QC.mainedot@maine.gov email address and remain on-file (in print) and be available for inspection at the QC laboratory. The Contractor shall sample, test, and evaluate Hot Mix Asphalt Pavement in accordance with the minimum frequencies per each approved mix design:

TABLE 6: MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	Frequency	Test Method
Temperature of mix	6 per day at street and plant	-
Temperature of mat	4 per day	-
%TMD (In-Place Density - Surface)	1 per 125 ton	AASHTO T 355 or AASHTO T 343
%TMD (In-Place Density - Base)	1 per 250 ton	AASHTO T 355 or AASHTO T 343
Fines / Effective Binder	1 per 500 ton	AASHTO T 312*
Gradation	1 per 500 ton	AASHTO T 30
PGAB Content	1 per 500 ton	AASHTO T 164 or AASHTO T 308
Voids at N_{design}	1 per 500 ton	AASHTO T 312*
VMA at N_{design}	1 per 500 ton	AASHTO T 312*
Rice Specific Gravity	1 per 500 ton	AASHTO T 209
Percent Fractured Particles	1 per 5,000 ton	AASHTO T 335
Flat and Elongated Particles	1 Per 5,000 ton	ASTM D4791
Fine Aggregate Angularity	1 Per 5,000 ton	AASHTO T 304

*Method A and B only

The Contractor shall monitor plant production on each approved mix design using running average of three control charts as specified in Section 106 - Quality. Control limits shall be as noted in Table 7 below. The UCL and LCL, shall not exceed the allowable gradation control points for the particular type of mixture as outlined in Table 1 of Section 703.09.

TABLE 7: CONTROL LIMITS

Property	UCL and LCL
Percent Passing 4.75 mm and larger sieves	Target +/- 4.0
Percent Passing 2.36 mm sieve	Target +/- 2.5
Percent Passing 0.075 mm sieve	Target +/- 1.0
PGAB Content	Target +/- 0.25
VMA at N_{design}	LCL = LSL + 0.2
Voids at N_{design}	JMF Target +/- 1.2
Theoretical Maximum Specific Gravity	JMF Target +/- 0.020

The Contractor shall submit all QC test and inspection reports and updated control charts to the Resident and QC.mainedot@maine.gov by email. The reports and updated control charts shall be signed by the appropriate technician and be submitted to the Department by 1:00 P.M. on the next working day, except when otherwise noted in the QCP and approved by the Department.

The Contractor shall also retain splits of the previous 5 QC tests, with QC results enclosed for random selection and testing by the Department. Test results of splits that do not meet the Dispute Resolution

Variance Limits in Table 18 shall trigger an investigation by the MaineDOT Independent Assurance Unit and may result in that lab losing NETTCP certification and the ability to request a dispute [Section 401.50 - Process for Dispute Resolution].

The Contractor shall make density test results, including randomly sampled densities, available to the Department onsite. Summaries of each day's results, including a daily paving report summarizing the mixture type, mixture temperature, equipment used, environmental conditions, and the number of roller passes, shall be recorded and signed by the QCT and provided to the QC.mainedot@maine.gov email address and Resident in writing by 1:00 p.m. the next working day. The Contractor shall fill all holes in the pavement resulting from cutting cores by the Contractor or the Department with a properly compacted, acceptable mixture no later than the following working day. Before filling, the Contractor shall carefully clean the holes and apply a coating of emulsified asphalt. The Contractor may only cut additional cores for verification of the densometer, at a rate not to exceed 3 per day or 2 per 1000 ton placed.

If the Contractor's control chart shows the process for a given mix design to be out of control (defined as a single point outside of the control limits on the running average of three chart) on any property listed in Table 7: Control Limits, the Contractor shall notify the Resident of all affected projects in writing of the corrective action by 1:00 PM the next working day. The written description shall detail what action is being taken by the Contractor to bring the property in question back within control limits. Subsequent quality control results are expected to demonstrate an improvement and regression towards the aim. The Department reserves the right to take action, to include cessation of production, in the case of repeated results outside the Table 7 control chart control limits.

On a daily basis, or whenever equipment type or sequence is modified, the Contractor shall perform density testing across the mat being placed, prior to being compacted by equipment at 12 in intervals. If the density values vary by more than 2.0% from the mean, the Contractor shall make adjustments to the screed until the inconsistencies are remedied. Failure to replace or repair defective placement equipment may result in a letter of suspension of work and notification of a quality control violation resulting in possible monetary penalties as governed by Section 106 – Quality.

The Contractor shall cease paving operations whenever one of the following occurs:

a. The quality level for density using all quality control tests for the current Lot is less than 60 PWL.
b. The Coarse Aggregate Angularity or Fine Aggregate Angularity value falls below the requirements of Section 703.07, Table 3: Aggregate Consensus Properties Criteria for the design traffic level.
c. The Flat and Elongated Particles value exceeds 10% by ASTM D4791.
d. There is any visible damage to the aggregate due to over-densification other than on variable depth shim courses.
e. The Contractor fails to follow the approved QCP.

The Contractor shall notify the Resident in writing as to the reason for shutdown, as well as the corrective action, by the end of the workday. Failure to do so will be treated as a second incident under 106.4.6 QCP Non-compliance. The Department will only allow the continuation of paving operations when it is satisfied the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production. The Department

retains the exclusive right, with the exception of the first day's production of a new JMF, to determine whether the resumption of production involves a significant change to the production process. If the Department so determines, then the current lot will be terminated, a pay factor established, and a new lot will begin.

The Contractor may utilize innovative equipment or techniques not addressed by the Contract documents to produce or monitor the production of the mix, subject to approval by the Department.

401.192 Quality Control for Method D, (sidewalks, drives, islands & incidentals) and visual acceptance items

A QCP, certified QC personnel, or Prepave Meeting shall not be required for Item 403.209 - Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (sidewalks, drives, islands & incidentals) accepted under visual or Method D. An approved JMF shall be provided to the Resident prior to placement.

401.20 Acceptance Method A & C These methods utilize Quality Level Analysis and pay factor specifications. For Hot Mix Asphalt Pavement designated for acceptance under Quality Assurance provisions, the Department will sample once per sublot on a statistically random basis, test, and evaluate in accordance with the Acceptance Properties as outlined in Table 8:

TABLE 8: ACCEPTANCE PROPERTIES – METHOD A & C

Properties	Point of Sampling	Test Method
Gradation	Paver Hopper	AASHTO T 30
PGAB Content	Paver Hopper	AASHTO T 308
% TMD (In-Place Density)	Mat behind all Rollers	AASHTO T 269
Voids at N_{design}	Paver Hopper	AASHTO T 312
VMA at N_{design}	Paver Hopper	AASHTO T 312
Fines to Effective Binder	Paver Hopper	AASHTO T 312
VFB	Paver Hopper	AASHTO T 312

The Department will obtain samples of Hot Mix Asphalt Pavement in conformance with AASHTO R 97, Sampling Asphalt Mixtures, and the MaineDOT Policies and Procedures for HMA Sampling and Testing. The Contractor shall transport the samples in containers provided by the Department to the designated MaineDOT Laboratory within 48 hours except when otherwise noted in the project specific QCP or as directed by the Resident. Failure to deliver an acceptance sample to the designated acceptance laboratory will be considered the second incident under 106.4.6–QCP Non-Compliance.

Target values shall be as specified in the JMF. The Department will withhold reporting of the test results for the Acceptance sample until 7:00 AM, on the second working day of receipt of the sample, or after receipt of the Contractors results of the Acceptance sample split. Upon conclusion of each lot being evaluated under quality level analysis, where there is a minimum of four sublots, results shall be examined for statistical outliers, as stated in Section 106.7.2 - Statistical Outliers.

Lot sizes and sublot sizes shall be determined as outlined in Table 9.

TABLE 9: LOT AND SUBLOT SIZES – METHOD A & C

Lot Size*	Entire production per item per contract up to 6000 ton
Maximum Sublot Size – Mix	750 ton
Maximum Sublot Size – Density	Surface Layers – 250 ton Base / Intermediate Layers – 500 ton
Minimum Number of Samples – Mix	Four
Minimum Number of Samples – Density	Five

*Unless otherwise agreed upon at the Prepave Meeting

If there is less than one-half of a sublot remaining at the end, then it shall be combined with the previous sublot. If there is more than one-half sublot remaining at the end, then it shall constitute the last sublot

and shall be represented by test results. If it becomes apparent partway through a Lot that, due to an underrun, there will be insufficient mix quantity to obtain the minimum number of sublots needed, the Resident may adjust the size of the remaining sublots and select new sample locations based on the estimated quantity of material remaining in the Lot. Unanticipated over-runs of up to 1500 ton shall be rolled into the last lot. Cases where the lot is terminated prior to reaching completion shall be handled in accordance with Section 106.7.3 Early Termination of Lots. In cases where density incentive/disincentive provision apply, additional cores shall be taken to attain a minimum of three for the Lot.

Isolated Areas During the course of inspection, should it appear that there is an isolated area that is not representative of the lot based on a lack of observed compactive effort, excessive segregation, a change in process or any other questionable practice, that area may be isolated and tested separately. An area so isolated that has a calculated pay factor below 0.80 for Method A, based on three random tests shall be removed and replaced at the expense of the Contractor for the full lane width and a length not to be less than 150 ft.

TABLE 10: ACCEPTANCE LIMITS – METHOD A & C

Property	**USL and LSL**	
	Method A	**Method C**
Percent Passing 4.75 mm and larger sieves	Target +/- 7%	Target +/- 7%
Percent Passing 2.36 mm to 1.18 mm sieves	Target +/- 4%	Target +/- 5%
Percent Passing 0.60 mm sieve	Target +/- 3%	Target +/- 4%
Percent Passing 0.30 mm to 0.075 mm sieve	Target +/- 2%	Target +/- 2%
PGAB Content	Target +/- 0.4%	Target +/- 0.4%
Voids at N_{design}	4.0% +/- 1.5%	N/A
Fines to Effective Binder	0.9 +/- 0.3	N/A
VMA at N_{design}	LSL from Table 1	N/A
VFB	Table 1 plus a 4% production tolerance for USL	N/A
% TMD (In-place Density)	94.5% +/- 2.5%	94.5% +/- 2.5%

Cease Production The Contractor shall cease paving operations whenever one of the following occurs on a lot in progress:

TABLE 11: CEASE PRODUCTION – METHOD A & C

Property	Percent Within Limits (PWL)	
	Method A	**Method C**
Percent Passing NMAS sieve*	<60 PWL	<60 PWL
Percent Passing 2.36 mm sieve*		
Percent Passing 0.30 mm sieve*		
Percent Passing 0.075 mm sieve*		
PGAB Content		
Voids at N_{design}		N/A
Fines to Effective Binder*		
VMA at N_{design}		
VFB		
% TMD (In-place Density)		<60 PWL

*Paving operations shall not be required to cease if the mean test value is equal to the LSL or USL and s = 0.

In cases where the Contractor is to cease paving operations based upon an Acceptance result or payfactor, the Contractor will submit a corrective action plan to the Department. The Department will only allow the continuation of paving operations when it is satisfied the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production.

401.201 Pay Adjustment - Method A & C The Department will use the following criteria for pay adjustment at the completion of the Lot using the pay adjustment factors under Section 106.7 - Quality Level Analysis:

Density Upon conclusion of each lot, density results shall be examined for statistical outliers as stated in Section 106.7.2. If the pay factor for Density falls below 0.80, all of the cores will be randomly re-cut by Sublot. A new pay factor will be calculated that combines all initial and retest results. If the resulting pay factor is below 0.80 , the entire Lot shall be removed and replaced with material meeting the specifications at no additional cost to the Department, except that the Department may, when it appears that there is a distinct pattern of defective material, isolate any defective material by investigating each mix sample sublot and require removal of defective mix sample sublots only, leaving any acceptable material in place if it is found to be free of defective material. Pay factors equal to or greater than the reject level will be paid accordingly.
Mix Properties The Department will determine a pay factor (PF) using the applicable Acceptance Limits. If all three pay factors for PGAB Content, VMA at N_{design}, and Voids at N_{design} fall below 0.80 for Method A, then the composite pay factor for PGAB Content, VMA at N_{design}, and Voids at N_{design} shall be 0.50.

The following variables will be used for pay adjustment:

PA = Pay Adjustment
Q = Quantity represented by PF in ton
P = Contract price per ton
PF = Pay Factor

The Department will determine a pay adjustment using Table 12: Pay Adjustment Calculations as follows:

TABLE 12: PAY ADJUSTMENT CALCULATIONS – METHOD A & C

Acceptance Method	Mix Properties / Gradation	Density
Method A	PA = (Voids @ N_d PF - 1.0)(Q)(P)x0.20 + (VMA @ N_d - 1.0)(Q)(P)x0.20 + (PGAB Content PF- 1.0)(Q)(P)x0.10	PA = (density PF- 1.0)(Q)(P)x0.50
Method C	PA = (% Passing Nom. Max PF-1.0)(Q)(P)x0.05+(% passing 2.36 mm PF-1.0)(Q)(P)x0.05+(%passing 0.30 mm PF-1.0)(Q)(P)x0.05+(%passing 0.075 mm PF-1.0)(Q)(P)x0.10+(PGAB Content PF-1.0)(Q)(P)x0.25	PA = (density PF- 1.0)(Q)(P)x0.50

In addition, for 9.5 mm NMAS mixtures the following pay adjustment shall also apply:

The average percent passing for the 0.075 mm sieve shall be evaluated for each Lot. If the average is greater than 6.5%, a pay adjustment according to Table 13 below shall apply in addition to the other pay adjustments for the given method of testing.

TABLE 13: 0.075 MM SIEVE PAY ADJUSTMENT

Average Percent Passing 0.075 mm Sieve	Pay Adjustment
6.6% - 7.0%	-5%
> 7.0%	-10%

The Department shall notify the Contractor whenever the average of at least three samples in a given Lot is greater than 6.5%.

401.21 Acceptance Method B & D Unless otherwise stated in the 403 special provision, the Lot shall be the entire mix quantity per item per contract. The Department will sample once per sublot per pay item on a statistically random basis, test, and evaluate in accordance with the Acceptance Properties in Table 14. The Department will obtain samples of Hot Mix Asphalt Pavement in conformance with AASHTO R 97, Sampling Asphalt Mixtures, and the MaineDOT Policies and Procedures for HMA Sampling and Testing. The Contractor shall transport the samples in containers provided by the Department to the designated MaineDOT Laboratory within 48 hours except when otherwise noted in the project specific QCP or as directed by the Resident. Failure to deliver an acceptance sample to the designated acceptance laboratory will be considered the second incident under 106.4.6–QCP Non-Compliance. Target values shall be as specified in the JMF. The Department will withhold reporting of the test results for the Acceptance sample until 7:00 AM, on the second working day of receipt of the sample, or after receipt of the Contractors results of the Acceptance sample split.

TABLE 14: ACCEPTANCE PROPERTIES – METHOD B & D

Properties	Point of Sampling		Test Method
	Method B	Method D	
Gradation	Paver Hopper	Paver Hopper or Truck	AASHTO T 30
PGAB Content	Paver Hopper	Paver Hopper or Truck	AASHTO T 308
% TMD (In-Place Density)	Mat behind all Rollers	Mat behind all Rollers	AASHTO T 269
Voids at N_{design}	Paver Hopper	N/A	AASHTO T 312
VMA at N_{design}	Paver Hopper	N/A	AASHTO T 312
Fines to Effective Binder	Paver Hopper	N/A	AASHTO T 312
VFB	Paver Hopper	N/A	AASHTO T 312

TABLE 15: LOT AND SUBLOT SIZES – METHOD B & D

Lot Size*	Entire mix quantity per item per contract	
Maximum Sublot Size – Mix	(Lot size ≤ 1000 tons)	(Lot size > 1000 tons)
	250 ton	750 ton
Sublot Size – Density	125 ton (Max 5 Sublots)	250 ton

*General – Lot and Sublot size may be adjusted to accommodate the work scope and schedule, or as otherwise agreed upon at the Prepave Meeting

TABLE 16: ACCEPTANCE LIMITS – METHOD B & D

Property	USL and LSL	
	Method B	Method D
Percent Passing 4.75 mm and larger	Target +/- 7%	Target +/- 7%
Percent Passing 2.36 mm sieve	Target +/- 5%	Target +/- 7%
Percent Passing 1.18 mm sieve	Target +/- 5%	Target +/- 5%
Percent Passing 0.60 mm sieve	Target +/- 4%	Target +/- 4%
Percent Passing 0.30 mm sieve	Target +/- 3%	Target +/- 3%
Percent Passing 0.075 mm sieve	Target +/- 3%	Target +/- 3%
PGAB Content	Target +/- 0.5%	Target +/- 0.5%
Voids at N_{design}	4.0% +/- 2.0%	N/A
Fines to Effective Binder	0.9 +/- 0.3	N/A
VMA at N_{design}	LSL from Table 1	N/A
VFB	Table 1 plus a 4% production tolerance for USL	N/A
% TMD (In-place Density)	94.5% +/- 2.5%	LSL of 92.0%

The Contractor shall cease paving operations whenever two consecutive Method B or D tests fall outside specification limits on the same property. The Contractor will submit a corrective action plan to the Department. The Department will only allow the continuation of paving operations when it is satisfied the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production.

401.211 Pay Adjustment - Method B & D For items accepted under Method B or D, if the mix is within the tolerances listed in Table 16, the Department will pay the contract unit price, otherwise pay adjustments as shown in Table 17 shall be applied to the quantity of mix represented by the test. The Contractor shall cut one 6 in core per sublot unless otherwise noted in Section 403 - Hot Mix Asphalt Pavement. If the density result is not within the specified limits the disincentive shall apply. If the sublot density is less than 88.5 percent or greater than 99.0 percent of the sublot TMD, two additional cores shall be cut at random locations determined by the Department. If either of the additional cores has a density less than 88.5 percent or greater than 99.0 percent of the sublot TMD, the sublot shall be removed and replaced at no cost to the Department; otherwise, the average of the three cores will be used to determine the sublot pay adjustment.

TABLE 17: PAY ADJUSTMENTS – METHOD B & D

Property	**Method B**		**Method D**	
Percent Passing 2.36 mm sieve	N/A		-2.0%	
Percent Passing 0.30 mm sieve	N/A		-1.0%	
Percent Passing 0.075 mm sieve	-2.0%		-2.0%	
PGAB Content	-5.0%		-5.0%	
Voids at N_{design}	-3.0%		N/A	
% TMD (In-place Density)	91.5% - 91.9% or 97.1% - 97.5%	-5.0%	91.5% - 91.9%	-5.0%
	90.5% - 91.4% or 97.6% - 98.5%	-10.0%	90.5% - 91.4%	-10.0%
	89.5% - 90.4% or 98.6% - 99.0%	-20.0%	89.5% - 90.4%	-20.0%
	88.5% - 89.4%	-30.0%	88.5% - 89.4%	-30.0%
	<88.5% or >99.0%	Reject	<88.5% or >99.0%	Reject

401.30 Method of Measurement The Department will measure Hot Mix Asphalt Pavement by the ton in accordance with Section 108.1 - Measurement of Quantities for Payment.

401.40 Basis of Payment The Department will pay for the work, in place and accepted, in accordance with the applicable sections of this Section, for each type of HMA specified.

The Department will pay for the work specified in Section 401.12, for the HMA used, except that cleaning objectionable material from the pavement and furnishing and applying bituminous material to joints and contact surfaces is incidental. Payment for this work under the appropriate pay items shall be full compensation for all labor, equipment, materials, and incidentals necessary to meet all related contract requirements, including design of the JMF, implementation of the QCP, obtaining core samples, transporting cores and samples, filling core holes, applying emulsified asphalt to joints, and providing testing facilities and equipment. The Department will make a pay adjustment for quality as specified in Section 401.20 Acceptance Method A & B or 401.21 Acceptance Method C & D.

401.50 Process for Dispute Resolution At the time of Hot-Mix Asphalt sampling, the Department will obtain a split sample of each Acceptance test random sample for possible dispute resolution testing. The Contractor shall also obtain a split sample of the HMA at this same time. If the

Contractor wishes to retain the option of requesting dispute testing of the initial Acceptance sample, the Contractor will test their split of the Acceptance sample in accordance with applicable AASHTO procedure and accepted supplemental practice as described in the Department's HMA Sampling and Testing Policies and Procedures manual. The Contractor shall report their results to the Resident, with a copy to Contractor.mainedot@maine.gov by 7:00 AM, on the second working day from time of QA sampling, otherwise dispute resolution will not be initiated. The Department's dispute resolution split sample will be properly labeled and stored for a period of at least two weeks after it has been reported, or until the sample is tested. The properties eligible for dispute and the respective variances are shown in Table 18.

The Contractor may dispute the Department's Acceptance results and request that the dispute resolution split sample be tested by notifying the Department's Resident and QA Engineer in writing within two working days after the results of the Acceptance test are reported. The following shall be provided in the request:

- Acceptance sample reference number
- The specific test result(s) or property(ies) being disputed, and
- The complete, signed report of the Contractor's testing (In a lab certified by the NETTCP and MaineDOT) of their split of the Acceptance sample indicating that the variances in Table 18 for the specific test result(s) or property(ies) were exceeded.

TABLE 18: DISPUTE RESOLUTION VARIANCE LIMITS

Property	Method A & B	Method C & D*	Variance Limits
PGAB Content	Yes	Yes	+/- 0.4%
G_{mb}	Yes	No	+/- 0.030
G_{mm}	Yes	No	+/- 0.020
Voids at N_{design}	Only if G_{mb} or G_{mm} is not disputable	No	+/- 0.8%
VMA at N_{design}	Only if G_{mb} or G_{mm} is not disputable	No	+/- 0.8%
Percent Passing 4.75 mm and larger sieves	No	Yes	+/- 4.0%
Percent Passing 2.36 mm to 0.60 mm sieves	No	Yes	+/- 3.0%
Percent Passing 0.30 mm to 0.15 mm sieves	No	Yes	+/- 2.0 %
0.075 mm sieve	Only for 9.5 mm NMAS mixes	Yes	+/- 0.8%

*Disputes will not be allowed on Item 403.209

The value of any disputed result or property reported for the initial Acceptance sample shall stand if the value reported for the dispute resolution sample is not closer to the value the Contractor reported for their split sample than to the value reported for the initial Acceptance sample. If the value reported for the dispute resolution falls precisely half-way between the other two values the value reported for the dispute resolution will replace the original acceptance value. Otherwise, the value reported for the dispute resolution sample will replace the value reported for the initial Acceptance sample and will be used to re-calculate any other affected results or properties.

SECTION 402 - PAVEMENT SMOOTHNESS

402.00 Smoothness Projects Projects to have their pavement smoothness analyzed in accordance with this Specification will be so noted in Special Provision 403 - Hot Mix Asphalt Pavement.

402.01 Pavement Smoothness The final pavement surface shall be evaluated for smoothness using a Class I or Class II profiler as defined by ASTM E950 (94). Smoothness measurements will be expressed in terms of the International Roughness Index (IRI) as defined by the World Bank, in units of inches/mile.

402.02 Lot Size Lot size for smoothness will be 3000 lane-feet. A sublot will consist of 50 lane-feet. Partial lots will be included in the previous lot if less than one-half the size of a normal lot. If equal to or greater than one-half the normal lot size, it will be tested as a separate lot.

402.03 Acceptance Testing The Department will conduct Acceptance testing following completion of the surface course. Sections to be excluded from testing include the following:

Bridge decks and joints (no smoothness measurements will be taken within 100 ft of bridge joints)
Acceleration and deceleration lanes
Shoulders and ramps
Side streets and roads
Within 100 ft of transverse joints at the beginning and end of the project
Within 100 ft of railroad crossings
Urban areas with speed limits of 30 mph or lower

Each lot shall have 2 measurements made in each wheel path. The average of the 4 measurements will determine the smoothness for that lot. The smoothness measurements will be statistically evaluated for pay factors as described in Subsection 106.7 - Quality Level Analysis, using the specification limits shown below.

TABLE 1: ACCEPTANCE LIMITS

Level	**USL**
I	55 in/mile
II	65 in/mile
III	75 in/mile

Computation of Smoothness Pay Adjustment:

PA = (PF-1.0)(Q)(P)
where:
Q = Quantity of surface course in the Lot (excluding shoulders, side streets, bridge decks, ramps, acceleration and deceleration lanes)
PF = smoothness pay factor for the Lot
P = Contract unit price for surface pavement
PA = pay adjustment

402.04 Unacceptable Work In the event that any Lot is found to have a pay factor less than 0.80, the Contractor shall take whatever remedial action is required to correct the pavement surface in that Lot at no additional expense to the Department. Such remedial action may include but is not limited to removal and replacement of the unacceptable pavement. In the event remedial action is necessary, the Contractor shall submit a written plan to the Resident outlining the scope of the remedial work. The Resident must approve this plan before the remedial work can begin. Following remedial work, the Lot shall be retested, and will be subject to the specification limits listed above. The resulting pay factor, if within the acceptable range, will be used in the final pay adjustment. The Contractor shall pay the cost of retesting the pavement following corrective action.

Localized surface tolerance defects will be subject to the provisions outlined in Section 401.11 Surface Tolerances.

Payment will be made under:

Pay Item	Pay Unit
402.10 Incentive/Disincentive - Pavement Smoothness	Lump Sum

SECTION 403 - HOT MIX ASPHALT PAVEMENT

403.01 Description This work shall consist of constructing one or more courses of Hot Mix Asphalt pavement on an approved base in accordance with these specifications, and in reasonably close conformity with the lines, grades, thickness and typical cross sections shown on the plans or established. The HMA pavement shall be composed of a mixture of aggregate, filler if required, and asphalt material.

403.02 General The materials and their use shall conform to the requirements of Section 401 - Hot Mix Asphalt Pavement.

403.03 Construction The construction requirements shall be as specified in Section 401 - Hot Mix Asphalt Pavement.

403.04 Method of Measurement Hot mix asphalt pavement will be measured as specified in Section 401.21- Method of Measurement.

403.05 Basis of Payment The accepted quantities of hot mix asphalt pavement will be paid for at the contract unit price per ton for the mixtures, including hot mix asphalt material complete in place. Method A, Method B, Method C and Method D shall be used for acceptance as specified in Section 401 - Hot Mix Asphalt Pavements. (See Complementary Notes, Section 403 - Hot Mix Asphalt Pavement, for Method location).

Payment will be made under:

Pay Item		Pay Unit
403.102	Hot Mix Asphalt Pavement for Special Areas	Ton
403.206	Hot Mix Asphalt, 25 mm Nominal Maximum Size	Ton
403.207	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size	Ton
403.2071	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size (Polymer Modified)	Ton
403.2072	Asphalt Rich Hot Mix Asphalt, 19.0 mm Nominal Maximum Size (Asphalt Rich Base and Intermediate course)	Ton
403.208	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size	Ton
403.2081	Hot Mix Asphalt - 12.5 mm Nominal Maximum Size (Polymer Modified)	Ton
403.209	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Sidewalks, Drives, Islands & Incidentals)	Ton
403.210	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size	Ton
403.2101	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Polymer Modified)	Ton
403.2104	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Thin Lift Surface Treatment)	Ton
403.211	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Shimming)	Ton
403.2111	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Shimming, Polymer Modified))	Ton
403.212	Hot Mix Asphalt, 4.75 mm Nominal Maximum Size	Ton
403.213	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course)	Ton
403.2131	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course, Polymer Modified)	Ton
403.2132	Asphalt Rich Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course)	Ton
403.214	Hot Mix Asphalt, 4.75 Nominal Maximum Size (5/8” Surface Treatment)	Ton

SPECIAL PROVISION
SECTION 403
HOT MIX ASPHALT PAVEMENT

Desc. Of Course	Grad Design.	Item Number	Total Thick	No. Of Layers	Comp. Notes
8" HMA - Full Construction Areas (As Indicated) Route 9 Connector, Ramps A & C Travelway & Ramp Shoulders					
Wearing	12.5 mm	403.2081	1 ½"	1	2,5,7,22,23,24,25,26,28,29,40,42,44
Intermediate	12.5 mm	403.2131	1 ½"	1	2,5,7,22,23,24,25,26,28,29,40,42,44
Base	12.5 mm	403.2131	2"	1	2,4,7,22,23,24,25,26,28,29,40,41,44
Rich Base	19.0 mm	403.2072	3"	1	2,4,7,25,28,29,40,41
5" HMA - Full Construction Areas (As Indicated) Route 9 Business, Ramps B, D, E, & F Travelway & Ramp Shoulders					
Wearing	12.5 mm	403.2081	1 ½"	1	2,5,7,22,23,24,25,26,28,29,40,42,44
Intermediate	12.5 mm	403.2131	1 ½"	1	2,5,7,22,23,24,25,26,28,29,40,41,42,44
Base	12.5 mm	403.2131	2"	1	2,4,7,22,23,24,25,26,28,29,40,41,44
3" HMA - Full Construction Areas (As Indicated) Route 9 - Connector, Business, & Old Route 9 Shoulders					
Wearing	12.5 mm	403.2081	1 ½"	1	2,5,7,22,23,24,44
Base	12.5 mm	403.2131	1 ½"	1	2,5,7,22,23,24
1 ½" Mill & HMA Overlay (As Indicated) I-395, Route 1A, Ramps A & C Travelway & Shoulders					
Wearing	12.5 mm	403.2081	1 ½"	1	2,5,7,22,23,24,25,26,28,29,43
4" HMA - Full Construction Areas (As Indicated) Eastern Ave, Lambert Rd, Levenseller Rd, Clewleyville Rd Lakeman Lane, Old Route 9, & Jughandle Travelway & Shoulders					
Wearing	12.5 mm	403.2081	1 ½"	1	2,4,10,27
Base	12.5 mm	403.2131	2 ½"	1	2,4,10,27,41
1½" Mill & HMA Overlay (As Indicated) Eastern Ave, Lambert Rd, Levenseller Rd, & Clewleyville Rd Travelway & Shoulders					
Wearing	12.5 mm	403.2081	1 ½"	1	2,4,10,27
Variable Depth Shim (As Directed)					
Shim	9.5 mm	403.211	Variable	1	3,8,20,30
Drives & Incidentals (As Directed)					
Wearing	9.5 mm	403.209	2" – 3"	1/more	3,10,20,30,32

COMPLEMENTARY NOTES

2. The required PGAB shall be a storage-stable, homogeneous, polymer modified asphalt binder that meets **PG 64E-**28 grading requirements in AASHTO M 332. All polymer modified asphalt grades utilized on the Project shall be treated with an approved liquid anti-strip. PG binders shall be treated either at the asphalt source terminal with the required dose rate on the delivery documentation, or at the hot mix asphalt plant utilizing a system integrated with the plants controls that will introduce a minimum 0.50 percent anti-strip by weight of asphalt binder used unless a rate is otherwise recommended by the anti-strip manufacturer. The PGAB and anti-strip blend shall meet the **PG 64E-28** requirements. The Contractor shall provide supporting test data showing the PGAB and anti-strip blend meet the required criteria.
3. The aggregate qualities shall meet the design traffic level of <3 million ESALS for mix placed under this contract. The design, verification, Quality Control, and Acceptance tests for this mix will be performed at **65 gyrations**.
4. The aggregate qualities shall meet the design traffic level of 3 to <10 million ESALS for mix placed under this contract. The design, verification, Quality Control, and Acceptance tests for this mix will be performed at **65 gyrations**.
5. The aggregate qualities shall meet the design traffic level of >10 million ESALS for mix placed under this contract. The design, verification, Quality Control, and Acceptance tests for this mix will be performed at **65 gyrations**.
7. Section 106.6 Acceptance, (1) **Method A** as specified Section 401.20 - Quality Assurance Methods A and C.
8. Section 106.6 Acceptance, (2) **Method B** as specified Section 401.21 - Quality Assurance Methods B and D.
10. Section 106.6 Acceptance, (2) **Method D** as specified Section 401.21 - Quality Assurance Methods B and D.
20. The combined aggregate gradation required for this item shall be classified as a 9.5mm Thin Lift Mixture (TLM) mixture, using the Aggregate Gradation Control Points as defined in 703.09.
22. Longitudinal joint density testing shall be applied to the specified HMA layer. See Special Provision 401 – Hot Mix Asphalt Longitudinal Joint Density for project specifics.
23. The mixture shall meet the minimum requirements of Special Provision 401 – HMA Hamburg Wheel Tracker Specification. The Department shall collect 4 additional boxes of HMA on the first day of production and may collect additional material as deemed appropriate.
24. See Special Provision 401 - HMA with Fine Micro-Deval Requirement for project specifics.
25. The use of a Material Transfer Vehicle (MTV) shall be required on this layer. See Special Provision 401 – Material Transfer Vehicle for specifics.
26. The final pavement surface shall be evaluated for smoothness in accordance with the most current 400 Special Provision section 402 – Pavement Smoothness. Acceptance limits shall be as outlined under the **Level I** classification.
27. See Special Provision 401 - Pavement Safety Edge for project specifics.
28. The use of Pass Mapping Technology shall be required on the specified layer. See Special Provision 401 - Pass Mapping Technology for Asphalt Applications for project specifics.

29. The use of Continuous Thermal Profiling Technology shall be required on the specified layer. See Special Provision 401 - Hot Mix Asphalt Continuous Thermal Profiling for project specifics.
30. The incentive/disincentive provisions for density shall not apply. Rollers shall meet the requirements of this special provision. The use of an oscillating steel roller shall be required to compact all mixtures pavements placed on bridge decks.
32. Compaction of the new Hot Mix Asphalt Pavement will be obtained using a minimal roller train consisting of a **3-5 ton** vibratory roller. Areas less than 2 feet wide shall be compacted with a minimum of a **150 pound** plate compactor. An approved release agent is required to ensure the mixture does not adhere to hand tools, rollers, pavers, and truck bodies. The use of petroleum based fuel oils, or asphalt stripping solvents will not be permitted.
40. The entire roadway (from curb to curb) shall be considered mainline travelway for density testing purposes according to the specified testing method.
41. The lower two lifts of base HMA pavement (consisting of 5 inches in the 8 inch sections, 3½ inches in the 5 inch sections, and 2½ inches in the 4 inch sections) shall be completed before use by project construction equipment as a haul route, and in any section is opened to public vehicular traffic. Any HMA placed after the seasonal limitations shall be considered temporary and removed and replaced the following construction season. The Department will not be responsible for costs or time related to the placement, removal or replacement of temporary pavement.
42. The Contractor shall plan its construction sequencing so that no longitudinal joints fall within the mainline travelway lanes (excluding center turn lanes)
43. The Department shall profile railroad and bridge approaches every 10 feet along the roadway center line and edge of travelways, out to a match point at a minimum of 75 feet from the structure, to determine the approach pavement taper, elevations, and pavement removal or shim requirements. This work shall be accomplished in cooperation with the Contractor by means of conventional surveying equipment or blocking and string lines as cooperatively determined by the Contractor and Department. At minimum, the survey work will be completed 10 days prior to milling and/or paving operations.
44. The contractor shall mill a butted stepped joint into the existing pavement at both the beginning and end joints for each pavement layer excluding the bottom base layer. For each layer, the step joint shall be cut to the depth and width of the pavement layer being placed and extend 5 feet beyond the immediate underlying layer. The Resident may extend this length as determined by the condition of the match point. No additional payment will be made for the milling of the butt joints but will instead be considered incidental to associated paving items.

Tack Coat

A tack coat of emulsified asphalt, RS-1, RS-1h, CRS-1 or CRS-1h, Item 409.15 shall be applied to any existing pavement at a rate of approximately 0.030 gal/yd², and on milled pavement approximately 0.050 gal/yd² prior to placing a new course. A fog coat of emulsified asphalt shall be applied between shim /base courses and surface course as well as to any bridge membrane prior to the placement of HMA layers at a rate not to exceed 0.030 gal/yd². Tack used will be **paid for at the contract unit price** for Item 409.15 Bituminous Tack Coat.

SPECIAL PROVISION
SECTION 401
HOT MIX ASPHALT PAVEMENT
(Pass Mapping Technology for Asphalt Applications)

Description This work shall consist of the compaction of the asphalt mixtures utilizing Pass Mapping roller(s) in the breakdown position only within the limits of the work as described in the plans and will only apply to the layers as specified in Special Provision 403. Pass Mapping is defined as a process that uses vibratory rollers equipped with a measurement and documentation system that automatically records various critical parameters correlated to agency standard testing protocols in real time during the compaction process. Pass Mapping uses roller passes to document the roller movements in an effort to ensure a more uniform roller coverage is achieved through continuous monitoring of the compaction operation.

The purpose of this "pilot project" is to demonstrate Pass Mapping technology, to evaluate the benefits and effectiveness of the technology for improving compaction processes, and to simulate if Pass Mapping data can or should be used as part of a Performance Specification in the future. The Pass Mapping data that will be obtained on this project will not be used for approval or rejection of the project materials but will only be used to support research activities. The Department shall accept the work under the existing Quality Assurance provisions as specified in Standard Specification 106 and Special Provision 401.

EQUIPMENT

Pass Mapping Roller The Contractor shall provide Pass Mapping roller(s) that meet the following requirements:

1. Pass Mapping rollers shall be self-propelled double-drum vibratory rollers equipped with non-contact temperature sensors (accuracy of ±2.7º F) for measuring pavement surface temperatures.
2. Global positioning system (GPS) radio and receiver units shall be mounted on each Pass Mapping roller to monitor the drum locations and track the number of passes of the rollers.
3. The rollers shall include an integrated on-board documentation system that is capable of displaying real-time color-coded maps of measurement values including location of the roller, number of roller passes, pavement surface temperatures, roller speeds, vibration frequencies and amplitudes of roller drums.
4. The display unit shall be capable of transferring the data by means of a USB port.
5. The Pass Mapping roller shall meet the accuracy requirements stated in Table 1.

TABLE 1: REQUIRED INSTRUMENTED ROLLER EQUIPMENT ACCURACY

Operating Parameter	Accuracy
Global Positioning System (in x and y direction)	± 2 in
Rolling Speed	± 0.3 mph
Frequency	± 2 Hz
Amplitude	± 0.008 in
Mat Surface Temperature	± 2.7°F

Pass Mapping Rover The Contractor shall provide a hand-held GPS rover for the project. The hand-held GPS rover shall be a survey grade GNSS Rover Receiver capable of being used with a local ground-based Base Station or the Network RTK used for the project. The rover shall be able to display and store the date, time and X, Y, and Z Coordinates. An example of this is shown in Table 2.

TABLE 2: REQUIRED FORMAT OF ROVER DATA

Description	Data Format Examples
Date Stamp (MDDYY)	3/19/13
Time Stamp (HHMMSS.SS –military format)	21:46:22.96 (21 hr 46min. 22.96 s.
Northing (Y)	153328.47
Easting (X)	524195.65
Height (Z)	909.85

High Precision Positioning System (HPPS) The goal of HPPS requirements is to achieve accurate and consistent HPPS measurements among all HPPS devices (Pass Mapping Rollers, Rovers, etc.) on the same project. Conversions of HPPS data need to be minimized to avoid errors introduced during the process. The Contractor shall provide a HPPS system that meets the following requirements and definitions:

- GPS: A space-based satellite navigation system that provides location and time information in all weather, anywhere on or near the Earth to determine the location in geodetic coordinates. In this specification, GPS is referred to all GPS-related signals including US GPS, and other Global Navigation Satellite Systems (GNSS).
- Hand-Held GPS rover: A portable GPS radio/receiver for in-situ point measurements.
- GPS Base Station: A single ground-based system that consists of a GPS receiver, GPS antenna, radio and radio antenna to provide L1/L2 differential GPS correction signals to other GPS receivers within a range limited by radio, typically 3 miles in radius without repeaters.
- Network RTK: Network RTK is a system that use multiple bases in real-time to provide high-accuracy GPS positioning within the coverage area that is generally larger than that covered by a ground-based GPS base station; e.g., VRS.
- GPS Correction Service Subscription: A service that can be subscribed to receive VRS

signals in order to achieve higher accuracy GPS positioning normally via cellular wireless data services; i.e., without the need for a ground-based base station. Examples of GPS Correction Service subscriptions are: Trimble VRSTM, Trimble VRS NOWTM, OmniSTAR, etc. Maine DOT GPS Continuously Operating Reference Station (CORS) is also an acceptable option and information for CORS can be viewed at http://www.maine.gov/mdot/surveyinfo/

- RTK-GPS: Real Time Kinematic Global Positioning Systems based on the use of carrier phase measurements of the available GPS signals where a single reference station or a reference station network provides the real-time corrections in order to achieve centimeter-level accuracy.
- UTM Coordinates: Universal Transverse Mercator (UTM) is a 2-dimentional Cartesian coordinates system that divides the surface of Earth between 80°S and 84°N latitude into 60 zones, each 6° of longitude in width and centered over a meridian of longitude. Zone 1 is bounded by longitude 180° to 174° W and is centered on the 177th West meridian. The UTM system uses projection techniques to transform an ellipsoidal surface to a flat map the can be printed on paper or displayed on a computer screen. Note that UTM is metric-based.
- Geodetic Coordinates: A non-earth-centric coordinate system to describe a position in longitude, latitude, and altitude above the imaginary ellipsoid surface based on a specific geodetic datum. WGS-84 and NAD83 datum are required for use with UTM and State Plans, respectively.
- ECEF XYZ: Earth-Centered, Earth-Fixed Cartesian X, Y, Z coordinates.
- Grid: Referred to ECEF XYZ in this specification.
- GUI Display: Graphical User Interface Display.
- State Plane Coordinate: A set of 124 geographic zones or coordinate systems designed for specific regions of the United States. Each state contains one or more state plane zones, the boundaries of which usually follow county lines. The current State Plane coordinate is based on NAD83. Issues may arise when a project crosses state plane boundaries.
- UTC: Coordinated Universal Time (UTC) is commonly referred to as Greenwich Mean Time (GMT) and is based on a 24 hours' time scale from the mean solar time at the Earth's prime meridian (zero degrees longitude) located near Greenwich, England.

All GPS devices for this project shall be set to the same consistent coordinate datum/system no matter whether GPS or Grid data are originally recorded. UTM is the preference and shall be set to zone no.19 N for this project. The records shall be in meters. Use of UTM will facilitate GPS data checks onsite.

If UTM coordinates are not available, the State Plane Coordinate system can be used and set as NAD83for this project. See Maine CORS info above under GPS Correction Service Subscription. Use US Survey Feet rather than International Survey Feet for this system.

CONSTRUCTION DETAILS

The Contractor shall provide the GPS system (including GPS receivers on Pass Mapping

breakdown rollers and hand-held GPS receivers (Rovers)) that makes use of the same reference system that can be a ground-based base station or network-RTK, to achieve RTK-GPS accuracy. The Contractor shall ensure that the system has the capability to collect data in an established project coordinate system. The GPS system used for broadcasting differential correction data to the rollers shall have a tolerance of less than 2 inches in the X and Y direction. Examples of combinations are:

1. GPS receivers on Pass Mapping breakdown rollers and hand-held GPS rovers referenced to the same on-ground base station.
2. GPS receiver on Pass Mapping breakdown rollers and hand-held GPS receivers referenced to the same network RTK.

The recorded GPS data, whether from the Pass Mapping breakdown rollers or hand-held GPS rovers, shall be in the following formats:

1. Time: The time stamp shall be in military format, hhmmss.ss in either UTC or local time zone. 0.01 second is required to differentiate sequence of Pass Mapping data points during post process.
2. GPS: Latitudes and longitude shall in ddmm.mmmmmmmm or decimal degrees, dd.dddddddd. Longitudes are negative values when measuring westward from the Prime Meridian.
3. Grid: Coordinates shall be in feet with at least 2 digits of significance (0.01 ft.).

When importing Pass Mapping data into the data analysis management program, the GPS data and associated Pass Mapping measurements shall be stored with minimum data conversions and minimum loss of precisions. Users can then select unit of preference to allow real time unit conversion for the GUI display.

The Contractor shall follow the vendor-specific instructions to export Pass Mapping data to VETA-compatible formats. The Contractor shall import the Pass Mapping roller data into the latest version of VETA and enter GPS point measurements from the rover and visually inspect the Pass Mapping map and point measurements on the VETA display screen for consistency.

Prior to paving the Department will provide training on the VETA software to the Contractor. This software is available on the website www.intelligentcompaction.com . The software program will utilize the data from the Pass Mapping roller for analysis of coverage, uniformity, and stiffness values during construction operations. As a minimum, the following Essential Pass Mapping Data Information and Pass Mapping Data Elements shall be available for post processing:

- Essential Pass Mapping Data Header Information for Each Data File or Section:

Item No.	Description
1	Section Title
2	Machine Manufacture
3	Machine Type
4	Machine Model
5	Drum Width (ft.)
6	Drum Diameter (ft.)
7	Machine Weight (ton)
8	Unit index for Pass Mapping
9	Reporting resolution for independent Pass Mapping – 90 degrees to the roller moving direction (mm)
10	Reporting resolution for independent Pass Mapping – in the roller moving direction (mm)
11	UTM Zone
12	Offset to UTC (hrs.)
13	Number of data points

- Essential Pass Mapping Data Elements for Each Data Point:

Item No.	Date Field Name	Example of Data
1	Date Stamp (YYYYMMDD)	e.g. 20080701
2	Time Stamp (HHMMSS.SS -military format)	e.g. 090504.00 (9 hr 5 min. 4.00 s.)
3*	Longitude (decimal degrees)	e.g. 94.85920403
4*	Latitude (decimal degrees)	e.g. 45.22777335
5*	Easting (ft.)	e.g. 354048.300
6*	Northing (ft.)	e.g. 5009934.900
7	Height (ft.)	e.g. 339.9450
8	Roller pass number	e.g. 2
9	Direction index	e.g., 1 forward, 2 reverse
10	Roller speed (mph)	e.g. 4.0
11	Vibration on	e.g., 1 for yes, 2 for no
12	Frequency (vpm)	e.g. 3500.0
13	Amplitude (inch)	e.g. 0.6
14	Surface temperature (°F)	e.g. 120
15	Intelligent compaction measurement values	e.g. 20.0

* Items 3 and 4 can be exclusive with items 5 and 6, and vice versa.

GPS Check Testing Prior to the start of production, the Contractor and representatives of the GPS and Pass Mapping roller manufacturer/vendor shall conduct the following to check the proper setup of the GPS, Pass Mapping roller(s) and the rover(s) using the same datum:

1. On a location nearby or within the project limits, the GPS base station (if required by the GPS) shall be established and the Pass Mapping roller(s) and the GPS rover tied into the same base station.
2. Verification that the roller(s) and rover are working properly and that there is a connection with the base station or with the network RTK service.
3. Production shall not begin until proper GPS verification has been obtained. Pass Mapping vendors' recommended verification process may be used to augment the following procedure.
   Move the Pass Mapping roller around until the GPS header computation is initialized. Move the Pass Mapping roller and park at a selected location. Record the GPS measurements from the Pass Mapping roller ensuring the distance offsets are applied so that the GPS coordinate is at the center or at left/right edges of the front drum. Mark two locations on the ground adjacent to the right and left edges of the front drum contact patch. Move the Pass Mapping roller from the marked locations. Use a hand-held rover to measure at the marked locations. Average the rover GPS measurements if the roller GPS measurement is at the center of the front drum. The differences between the roller GPS and rover measurements shall be within 6 inches for northing and easting. Repeat this procedure if multiple breakdown rollers are used on the project.
4. The temperature sensor (s) shall be powered on for a minimum of 10 minutes before verifying measurements. Collect and compare the temperature measurements from an independent device and the Pass Mapping roller front sensor (and for the rear mounted sensor when also installed on the roller). The temperatures must compare within 5º F (2.8º C).
5. GPS check testing shall be conducted daily during production operations to ensure consistency and accuracy of GPS and Temperature measurements for all GPS/Temperature devices prior to the paving and compaction operations.

Technical Assistance The Contractor shall coordinate for on-site technical assistance from the Pass Mapping roller representatives during the initial two (2) days of production and then as needed during the remaining operations. As a minimum, the roller representative shall be present during the initial setup and verification testing of the Pass Mapping roller(s). The roller representative shall also assist the Contractor with data management using the data analysis software including Pass Mapping data input and processing.

On-Site Training Prior to the start of work, the Contractor shall coordinate and provide for on-site Pass Mapping technology training for Contractor and Agency project personnel.
Contractor's personnel shall include the paving superintendent, QC technician(s), and roller operator(s). Agency's personnel shall include the project engineer and field inspector(s). Minimum training topics shall include:

1. Background information for the specific Pass Mapping system(s) to be used
2. Setup and checks for Pass Mapping system(s), GPS receiver, base-station and hand held

rovers
3. Operation of the Pass Mapping system(s) on the roller; i.e., setup data collection, start/stop of data recording, and on-board display options
4. Transferring raw Pass Mapping data from the rollers(s); i.e., via USB connections
5. Operation of vendor's software to open and view raw Pass Mapping data files and exporting all-passes and final coverage data files in VETA-compatible format.

Pass Mapping Construction Area Pass Mapping Construction areas are defined as subsections of the project being worked continuously by the Contractor. The procedure for determining and documenting the limits of the construction area shall be provided to the Engineer.

Pre-Pave Meeting A discussion about the Pass Mapping installation, collection, and research testing plan shall be held at the project prepave meeting. The Contractor's QC team for the project (QC administrator and project QCT) shall be present for the meeting.

QUALITY CONTROL

The Contractor shall prepare and submit a written Quality Control Plan (QCP) for the project Pass Mapping work. This Pass Map information shall be included with the current HMA project specific QC Plan. As a minimum, the Pass Mapping QCP shall contain the following information:

General Pass Mapping Requirements:

1. Pass Mapping Roller Operator (s) --- The person(s) responsible for operating the Pass Mapping roller(s) and attached Pass Mapping equipment. Sufficient training for the roller operator(s) shall be supplied by a representative of the manufacturer of the equipment.
2. Pass Mapping QC Technician(s)/Supervisor --- The person (s) responsible for conducting quality control and inspection activities to implement the Pass Mapping portion of the QC Plan. This person (s) shall be responsible for the following minimum functions:
   a) Daily GPS check testing for the Pass Mapping roller(s) and rover(s).
   b) Test section construction to establish the target compaction pass counts, roller amplitude and frequency settings, and target values for the strength of the materials using standard test devices; i.e., non-destructive density gauges, nuclear gauges, pavement cores and Pass Mapping rollers.
   c) Monitoring the construction operations and the Pass Mapping roller(s) during production and final evaluation operations.
   d) Quality control testing to monitor the pavement temperature and the required level of compaction.
   e) Daily procedure to download raw data, share raw data with the Resident, and analyze the Pass Mapping data from the roller(s).
   f) Daily set-up, take down and secure storage of the GPS and Pass Mapping components.
   g) Providing the Pass Mapping roller(s) VETA compatible data to the Resident Engineer daily and VETA reports to the Resident Engineer within 36 hours of

obtaining the roller(s) data and test results.

h) Obtain GPS "boundary" data points for each day of paving. At a minimum, GPS boundary points shall be taken at both sides of the pavement mat at the beginning of paving, at both sides of the mat at 1000 foot intervals on tangents (500 foot intervals on curves) and at both sides of the pavement mat at the end of paving for each pavement pass per day.

3. Temperature Controls --- The Contractor shall provide details on their plans to achieve minimum mat temperatures during breakdown compaction. The Pass Mapping breakdown roller compaction process needs to be completed before the temperature falls below the minimum temperature established during the test section evaluation. A typical breakdown roller minimum temperature is 240º F.
4. Overview of equipment, vendors and processes that the Contractor proposes to use to obtain and analyze Pass Map data on this project.

The Contractor shall generate and review the VETA Reports and provide comments in the daily QC report for any issues noted. Examples of issues include pavement mat areas that have low number of passes, areas that have low temperatures or missing data.

Method of Measurement This item will not be measured as it will be paid as a lump sum for providing for the Intelligent Compaction Technology for Asphalt Applications on the project.

Basis of Payment The incorporating of the Intelligent Compaction process shall be paid at the contract lump sum price for Pass Mapping Technology for Asphalt Applications.
Payments will be made under:

Pay Item		Pay Unit
403.41	Pass Mapping Technology for Asphalt Applications	Lump Sum

SPECIAL PROVISION
SECTION 501
FOUNDATION PILES
(Rock Injector Pile Tip)

Subsection 501.048 Prefabricated Pile Tips is amended by adding the following paragraph:

Pile tips shown on the plans as Rock Injector Pile Tips shall be Rock Injector HP-80500 Pile Point, manufactured by Associated Pile and Fitting, or approved equal. Material specifications, attachment of pile tips, and seating of the piles shall be in accordance with Manufacturer's recommendations. If there is a conflict between the Manufacturer's recommendations and these Specifications, it shall be referred to the Geotechnical Engineer to resolve.

Subsection 501.06 Basis of Payment is amended by adding the following to the list of pay items:

	Pay Items	Pay Unit
501.903	Pile Tips - Rock Injector Point	Each

SPECIAL PROVISION
SECTION 501
FOUNDATION PILES
(Rock-Socketed H-Pile Foundations)

501.01 Description

The following is added to Subsection 501.01 of the Standard Specifications:

This work shall consist of providing all materials, equipment, and labor necessary for construction of rock-socketed H-pile foundations as shown on the Plans, or as directed or authorized by the Resident. Construction of rock-socketed H-Pile foundations shall be as specified in Section 501 of the Standard Specifications, except as amended herein.

501.02 Materials

The following is added to Subsection 501.02 of the Standard Specifications:

H-pile bearing plate material shall be ASTM A572 Grade 50 minimum. Bearing plate to pile fastening shall occur by welding the bearing plate to the pile tip web and flanges as shown on the Plans.

The Contractor shall select grout material supplied from a MaineDOT approved ready mixed concrete batch plant. Ready mixed grout shall achieve a minimum design compressive strength of 6,000 psi at 28 days, have an entrained air content between 6.0 and 9.0 percent, be non-shrink, flowable, and contain a non-shrink additive listed on the MaineDOT Qualified Products List (QPL) for expansive cements. At least 30 working days prior to beginning construction of the rock-socketed H-pile foundation, the Contractor shall submit the proposed grout mix design to the Resident for review. Grout mix design shall contain no aggregate larger than 0.375 (3/8) inches. In the same timeframe, the Contractor shall also submit to the Resident for review the name and contact information of the independent testing laboratory that will be used to sample and test the grout cubes throughout the course of work at a frequency of no less than once during each continuous grout placing operation. A minimum of six "sets" of 2-in. square grout cubes shall be taken during each grouting operation. One "set" of grout cubes shall consist of a minimum of three individual cubes (i.e., a minimum of 18 individual cubes per each grouting operation). Grout cubes shall be molded, cured and tested in accordance with ASTM C-109. Grout testing will not be measured and paid for separately, but will be considered incidental to related Pay Item No. 501.502. Standard Specification 105.7 shall govern the review process.

Aggregate for filling the annular space between the H-pile and bedrock (above the top of the grout zone) and the H-pile and the permanent casing shall meet the requirements of Subsection 703.22, Underdrain Backfill Material, Type C. The material requirements for the permanent casings are shown on the Plans.

501.03 Quality Control Plan

The following is added to Subsection 501.03 of the Standard Specifications:

At least 30 working days prior to beginning construction of the rock-socketed H-pile foundation, the Contractor shall submit an Installation and Quality Control Plan for review by the Resident. Standard Specification 105.7 shall govern the review process.

The Installation and Quality Control Plan shall, at a minimum, include the following:

A. List of proposed equipment to be used including but not limited to the following: drilling equipment, drills, drill bits, augers, buckets, drill casing, final cleaning and bottom inspection equipment, water recovery and treatment equipment, rock coring equipment, and tremies or grout pumps.
B. Details, methods and procedures for welding the bearing plate to the pile tip.
C. Details of the overall rock-socketed H-Pile foundation construction sequence in general and with respect to the construction of the abutments and mechanically-stabilized earth retaining walls.
D. Details of excavation methods in soils and bedrock, including methods of removing any obstructions such as boulders or cobbles.
E. Details of equipment and methods that will be used to clean bedrock-sockets after they have been advanced to the minimum required depth below top of bedrock as shown on the Plans and prior to H-pile and grout placement.
F. Material and dimensions of permanent casings.
G. Details of installing H-piles and supporting H-piles vertically and laterally in their final positions until laboratory test results have been submitted that indicate that the minimum required compressive strength of the grout has been achieved and the abutment is complete and in place.
H. Details of the grout mix design, placement methods, and grout placement quantity control.
I. Sample daily construction records.
J. Sample drilling and grout logs.
K. Details of how verticality of permanent casing and rock-socket will be determined.

501.042 Equipment

The following is added to Subsection 501.042 of the Standard Specifications:

Rock Sockets - Drilling of bedrock-sockets for rock-socketed H-Pile foundation shall use cased-hole drilling methods. The Contractor shall select excavation equipment and rock core tooling that achieves a near planar horizontal surface at the bottom of the rock-socket.

The excavation and drilling equipment shall have adequate capacity, including power, torque, and down thrust to excavate a socket at least 20 percent greater than the minimum socket length and diameter indicated on the Plans. When the material encountered cannot be drilled using conventional earth augers with soil or rock teeth and drill buckets, as agreed upon with the Resident, the Contractor shall provide drilling equipment including, but not limited to, rock core barrels, rock tools, air tools, and other equipment as necessary to construct the excavation to the minimum sizes (diameters) and depth below top of rock as shown on the Plans.

Failure by the Contractor to demonstrate adequate methods and equipment resulting in work not meeting this special provision will require the Contractor to propose alterations in equipment and/or methods to achieve satisfactory results. Any altered methods or construction equipment shall be at the Contractor's expense and incidental to Pay Item No. 501.502.

The Contractor shall perform the excavations required for bedrock-sockets at the plan locations shown on the Plans, through all materials encountered, to the minimum dimensions and minimum depths below top of rock shown on the Plans, or otherwise required by the Contract Documents.

501.043 Location and Alignment Tolerances.

The following is added to Subsection 501.043 of the Standard Specifications:

The Contractor shall secure the H-piles in place within the required horizontal and vertical tolerances prior to and after grout placement and backfilling. H-Piles shall be braced or suspended, or both, to ensure vertical and horizontal alignment tolerances are achieved.

The maximum vertical deviation between the bottom surface of each quadrant of a bedrock-socket shall be 0.5 inches. The highest point of the bedrock at the bottom of a rock socket after all residual material is removed from within the bedrock-socket footprint shall be considered the bedrock-socket bottom and shall not be above the minimum depth below top of rock as shown on the Plans.

The Contractor shall demonstrate to the Resident that a minimum of 50 percent of the bottom of each rock-socket shall have less than 0.5 inches of sediment at the time of grout placement. The use of a weighted tape, a solid rod, downhole video camera, or other suitable methods detailed in the Installation and Quality Control Plan and accepted by the Resident shall be used to determine the presence of sediment and the sediment thickness across the entire bottom of the rock-socket prior to placement of the H-piles.

The vertical distance between the bottom of the abutment and the top of the grout in a rock-socket shall not be less than that shown on the Plans. The maximum vertical deviation of the top of a grout column from that shown on the Plans shall be 2 inches.

501.047 Splicing Piles.

The following is added to Subsection 501.047 of the Standard Specifications:

Splicing of H-piles for rock-socketed H-Pile foundation is prohibited.

501.049 Drilling and Rock-Socket Excavation.

The following Subsection is added to the Standard Specifications:

The Contractor shall complete bedrock excavations at the plan locations, to the minimum depths below top of rock, and to the minimum dimensions shown on the Plans. Bedrock-socket bottom depths may be adjusted with approval of the Resident but shall not be shallower than the bottom depths shown on the Plans. Top of bedrock at each rock socket location will be determined in the field by the Resident.

The Contractor shall advance the drill casing into bedrock as necessary to create a positive seal at the bottom of the casing to prevent entry of soil and groundwater into the rock-socket. The use of vertically split-seamed, break-away style casing is prohibited. After a positive seal at the bottom of the casing is established, the excavation shall then continue into bedrock as an uncased or cased rock-socket to the minimum length and diameter indicated on the Plans. The rock-socket shall not be constructed until the casing is sealed in bedrock and until the casing is checked for plumbness. The plumbness tolerance requirements for permanent casing, and temporary casing, if used, shall be consistent with the H-pile plumbness tolerance requirements outlined in Standard Specification Section 501. Rock-socket excavation shall create a cylindrical opening no less than the minimum diameter indicated and to the full-depth shown on the Plans, or to the depth directed by the Resident. The Contractor shall avoid over-breakage of the rock surface to preserve the seal at the bottom of the drill casing. The constructed rock-socket bottom shall meet the specified tolerances and have a planar, or nearly planar horizontal surface.

The Contractor shall maintain a construction method log during drilling, excavation and cleaning of each rock socket shown on the Plans. At a minimum, the log shall contain information such as the: project name and WIN, date(s) the rock-socket is drilled and excavated, drilling and excavation start and stop time(s), personnel, weather, pile identification number, drilling and excavation equipment and methods, drilling resistance, rock-socket bottom cleaning method(s), number, type and vertical extent of obstructions, and measurements and estimation of seepage rate of groundwater through drill casing/bedrock seal.

The Contractor shall maintain a grout placement log during each grout placement operation. At a minimum, the log shall contain information such as the: project name and WIN, date of grout placement, bottom depth of grout tube prior to start of grouting, grout placement start and stop times, grout placement equipment and methods, personnel, and weather. Grout placement logs for each pile or placement shall also include the pile identification, quantity of grout placed, final elevation of the top of the grout placement, and grout flow or placement rate.

The Contractor shall dispose of excavated materials removed from socket excavations in accordance with the applicable specifications for disposal of excavated materials. Cleaning of the bedrock-socket may be performed by cleanout auger or bucket, reverse circulation, air-lifting, or vacuum excavation methods or other suitable methods detailed in the Installation and Quality Control Plan and accepted by the Resident.

The Contractor shall perform any necessary excavation for the rock-socketed H-pile foundation under this item. No separate payment will be made for excavation of materials of different densities or employment of special tools and procedures necessary to accomplish the excavation. Blasting is prohibited.

The Contractor shall provide access and equipment to the Resident for checking the alignment of the drill casing and for checking the dimension, alignment, and cleanliness of the rock socket. A weighted tape or other method(s) approved by the Resident shall determine final pile and socket depths after final cleaning. The Contractor shall demonstrate acceptable socket cleanliness to the Resident and Geotechnical Engineer prior to grout placement. H-pile placement and grout placement operations shall not begin until the Resident's approval is obtained.

501.050 Obstructions

The following Subsection is added to the Standard Specifications:

The Contractor shall remove surface and subsurface obstructions at the pile locations. Obstructions may include but are not limited to manmade materials and natural materials such as cobbles and boulders. The Contractor shall clear obstructions by conventional excavation methods, special procedures and/or tools after it is determined that the drill casing cannot be advanced using conventional augers fitted with soil teeth, rock teeth, or drilling buckets. Such special procedures/tools include, but are not limited to: chisels, boulder breakers, core barrels, and air tools. Compacted suitable backfill, as determined by the Resident, shall replace materials removed by excavation methods. The removal of obstructions to construct rock-socketed H-pile foundations will be considered incidental to this item.

Drilling tools that are lost in the excavation shall not be considered obstructions. The Contractor shall promptly remove lost drilling tools without compensation. There will not be additional payment for costs incurred because of loss and recovery of drill tools.

501.051 H-Pile and Grout Installation

The following Subsection is added to of the Standard Specifications:

The H-pile shall be lowered to the bottom of the bedrock-socket and then raised and temporarily suspended 1 ft above the bottom of the rock-socket. The socket shall then be filled with grout using tremie methods. "Wet sticking" or placing the pile into wet grout, is prohibited. The Contractor shall support the H-Piles vertically and laterally in their final positions until

laboratory test results have been submitted that indicate that the minimum required compressive strength of the grout has been achieved and the abutment is complete and in place.

Rock-socketed H-Pile foundation grout and the grout mix shall conform to the materials portion of this Special Provision. Grout placement shall utilize tremie methods by introducing the grout below the bottom of the bearing plate in a continuous stream until the grout has filled the rock-socket to the level indicated on the Plans. The bottom of the tremie tube shall remain a minimum of 5 ft below the top of the grout column at all times during grouting operations. Displaced groundwater exiting the top of the drill casing shall be controlled and treated as necessary to protect adjacent water resources.

The permanently cased holes, between the top of the grout and the bottom of the concrete abutments, shall be backfilled with material that meets the requirements of Subsection 703.22, Underdrain Backfill Material, Type C. The Contractor shall place the material to the limits shown on the Plans.

After installation of H-piles, the Contractor shall protect the H-piles and permanent casing from impact or other disturbance during subsequent construction operations. Additional length of H-pile, bracing, and other incidentals associated with protecting the installed H-piles and casing and maintaining the vertical and lateral positions of the piles and casings, will be considered incidental to related items.

501.05 Method of Measurement.

The following is added to subsection 501.05 of the Standard Specifications:

A. Drilling Equipment Mobilization Rock-Socketed H-Piles. Mobilization of drilling equipment shall be as outlined in subsection 501.05(a), Equipment Mobilization.
B. Piles Furnished. Furnishing of H-piles for rock-socketed H-Pile foundation shall be as outlined in subsection 501.05 (b), Piles Furnished.
C. Piles in Place. Method of measurement for constructing rock-socketed H-pile foundation as described in this Section shall be measured by the linear foot of piles in place.

501.06 Basis of Payment.

The following is added to subsection 501.06 of the Standard Specifications:

The accepted quantity of Rock Socketed H-Piles, In Place, will be paid for at the Contract Unit Price per linear foot, complete and in place. Such payment will be full compensation for all materials, equipment, testing, and labor to install the piles, including excavation, installing the permanent casing, drilling out rock sockets, grouting, backfilling, and all incidentals necessary to complete the work specified in the Contract Documents.

Payment will be made as follows:

Pay Item		Pay Unit
501.502	Rock-Socketed H-Piles 117 lb/ft, in place	Linear Foot
501.804	Drilling Equipment Mobilization, Rock-Socketed H-pile	Lump Sum

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
A	502.219	Structural Concrete, Abutments and Retaining Walls	$400.00	A
A	502.26	Structural Concrete Roadway and Sidewalk Slab on Steel Bridges	$400.00	A
A	502.31	Structural Concrete Approach Slab	-	C
LP	502.49	Structural Concrete Curbs and Sidewalks	-	C

P values listed above reflect the price per cubic yard (yd^3) for all pay adjustment purposes.

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
A	502.219	Structural Concrete, Abutments and Retaining Walls	$400.00	A
A	502.26	Structural Concrete Roadway and Sidewalk Slab on Steel Bridges	$400.00	A
A	502.31	Structural Concrete Approach Slab	-	C
LP	502.49	Structural Concrete Curbs and Sidewalks	-	C
Fill	502.565	Concrete Fill	-	C

P values listed above reflect the price per cubic yard (yd^3) for all pay adjustment purposes.

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
A	502.219	Structural Concrete, Abutments and Retaining Walls	$400.00	A
A	502.26	Structural Concrete Roadway and Sidewalk Slab on Steel Bridges	$400.00	A
A	502.31	Structural Concrete Approach Slab	-	C
LP	502.49	Structural Concrete Curbs and Sidewalks	-	C

P values listed above reflect the price per cubic yard (yd^3) for all pay adjustment purposes.

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
A	502.219	Structural Concrete, Abutments and Retaining Walls	$400.00	A

P values listed above reflect the price per cubic yard (yd^3) for all pay adjustment purposes.

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
A	502.219	Structural Concrete, Abutments and Retaining Walls	$400.00	A
A	502.26	Structural Concrete Roadway and Sidewalk Slab on Steel Bridges	$400.00	A
A	502.31	Structural Concrete Approach Slab	-	C
LP	502.49	Structural Concrete Curbs and Sidewalks	-	C

P values listed above reflect the price per cubic yard (yd^3) for all pay adjustment purposes.

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
A	502.219	Structural Concrete, Abutments and Retaining Walls	$400.00	A
A	502.26	Structural Concrete Roadway and Sidewalk Slab on Steel Bridges	$400.00	A
A	502.31	Structural Concrete Approach Slab	-	C
LP	502.49	Structural Concrete Curbs and Sidewalks	-	C

P values listed above reflect the price per cubic yard (yd^3) for all pay adjustment purposes.

Brewer-Eddington
WIN 18915.00
August 14, 2021

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
LP	626.411	18-Inch Foundation	-	C
LP	626.421	24-Inch Foundation	-	C
LP	626.43	30-Inch Foundation	-	C
LP	645.12	Overhead Guide Sign (foundations)	-	C

SPECIAL PROVISION
SECTION 503
REINFORCING STEEL

Subsection 503.07 is amended by removing the table and following footnote and replacing with:

Minimum Lap Splice Length (inches)									
	Bar Size								
Bar Type	#3	#4	#5	#6	#7	#8	#9	#10	#11
Plain or Galvanized	16	20	24	29	38	47	59	72	85
Epoxy or Dual Coated	17	24	36	43	56	71	88	107	128
Stainless	19	24	30	36	47	59	73	89	107
Low-carbon Chromium	24	32	39	47	63	78	97	119	142

The minimum lap splice lengths in the table above are based on the parameters below. When any of these parameters are altered, appropriate minimum lap splice lengths will be as shown on the Plans.

- Normal weight concrete
- Minimum 28-day concrete compressive strength from 4,000 psi to 10,000 psi.
- Class B tension lap splice
- Minimum center-to-center spacing between bars of 6 inches
- Minimum clear cover of 2 inches.
- Nominal reinforcing steel yield strengths
  - Low-carbon Chromium = 100 ksi
  - Stainless = 75 ksi
  - All others = 60 ksi
- Reinforcement with yield strengths greater than 75 ksi shall have beam transverse reinforcement and column ties provided over the required lap splice length in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.

When lap splices are placed horizontally in an element where the concrete depth below the splice will be 12 inches, or more, the indicated lap splice lengths shall be multiplied by a factor of 1.3.

SPECIAL PROVISION
SECTION 507
RAILINGS
(Steel Approach Railing)

Description

This work consists of furnishing and installing steel approach railing and its attachment to a steel bridge railing system and guardrail transition.

Materials

All materials shall conform to the requirements of the Standard Specifications, Standard Details, and Contract Plans as applicable.

Construction Requirements

All components shall be fabricated and installed in accordance with the Standard Specifications, Standard Details, and Contract Plans at locations shown on the Plans or as directed by the Resident. The steel approach railing shall be positioned so as to provide a neat and smooth transition from the bridge railing to the highway guardrail, without kinks or abrupt change in orientation.

Embankment material around the rail posts shall be thoroughly compacted. Curbing shall be set flush with the face of the bridge curb.

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

Method of Measurement

Each installation will be measured for payment as one unit, complete in place and accepted.

Basis of Payment

Steel Approach Railing will be paid for at the Contract unit price for each installation. Such payment includes fabrication and installation of the railing components and attachment to the bridge railing system, bottom tube rail for 4-bar approach railing, and any related connection hardware in accordance with the Plans, Specifications, and Standard Details.

Payment will be made under:

Pay Item		Pay Unit
507.0812	Steel Approach Railing, 2-Bar	Each
507.0822	Steel Approach Railing, 3-Bar	Each
507.08161	Steel Approach Railing, 4-Bar	Each

SPECIAL PROVISION
SECTION 534
PRECAST STRUCTURAL CONCRETE
(Precast Concrete Box Culvert – State Supplied)

Amend Standard Specification Section 534 – Precast Structural Concrete as follows.

Remove 534.01 Description and replace with:

This work shall include the transportation and installation of the state supplied precast concrete box culverts in the following list as well as associated wingwalls, headwalls, toe walls, cut-off walls, and appurtenances in accordance with the Contract documents:

WIN 018915.50

Structure	Station	Delivery Site	Delivery Date
Snow Scooter Bridge	77+00	DOT Whiting Hill lot	March 1, 2022
Critter Crossing #1	272+35	Laydown in Route 9 ROW	June 1, 2023
White Tail Crossing Bridge	275+88	Laydown in Route 9 ROW	June 1, 2023
Snow Sled Bridge	284+27	Laydown in Route 9 ROW	June 1, 2023

Manufacturer Information:
CSI Concrete Systems, Inc.
9 Commercial Street Hudson, New Hampshire 03051
1-800-342-3374
Attention: Shelly O'Brien
Production Coordinator
Direct (603) 589-0927 Ext 438
sobrien@csigroup.com

WIN 018915.60

Structure	Station	Delivery Site	Delivery Date
Critter Crossing #2	289+11	Laydown in Route 9 ROW	June 1, 2022
Eaton Tributary Bridge	273+48	Laydown in Route 9 ROW	June 1, 2023

Manufacturer Information:
CSI Concrete Systems, Inc.
9 Commercial Street Hudson, New Hampshire 03051
1-800-342-3374
Attention: Attention: Shelly O'Brien
Production Coordinator
Direct (603) 589-0927 Ext 438
sobrien@csigroup.com

WIN 018915.70

Structure	Station	Delivery Site	Delivery Date
Felts Brook Bridge	55+08	DOT Whiting Hill lot	June 1, 2022
Felts Tributary Bridge	64+14	DOT Whiting Hill lot	June 1, 2022

Manufacturer Information:
American Concrete Industries
1717 Stillwater Avenue, Veazie, ME 04401
207-947-8334
Attention: Tristan Blanchard
Project Manager - Estimator
American Concrete Industries
1717 Stillwater Ave. - Veazie, ME
Phone: 207-947-8334
Fax: 866-414-9083
Cell: 207-991-0677

The approximate coordinates of the DOT Whiting Hill lot are: 44°46'22.9"N 68°43'23.4"W. An area of 10,000 SF, located off the northwest corner of I-395 in Brewer, known as Whiting Hill, has been provided for storage of the box culvert sections. Box culvert sections will be stored in a manner to allow access for installation starting from the downstream end without the need to reorganize any sections.

The approximate coordinates of the Laydown in Route 9 ROW are: 44°49'03.9"N 68°38'47.0"W. Refer to the 18915.50 and 18915.60 Plans on the MaineDOT website for more information on the location and site access for the Route 9 ROW laydown. Box culvert sections will be stored in a manner to allow access for installation starting from the downstream end without the need to reorganize any sections.

For deliveries made after project WIN 018915.00 is awarded, deliveries and unloading directly to the structure sites or other laydown locations that the Contractor may have acquired may be possible if desired by all parties and will be coordinated through the MaineDOT Project Manager.

Remove 534.02 Materials and replace with:

Bedding and backfill material shall be as shown on the plans. Material specified as Granular Borrow shall conform to the requirements of Standard Specification 703.19, Granular Borrow,

Material for Underwater Backfill, with the additional requirement that the maximum particle size shall be limited to 4 inches, or as shown on the Plans.

Remove 534.03 Drawings and replace with:

The Department will provide the Working Drawings, developed per the requirements of Standard Specification 534.03. Working Drawings are anticipated to be available starting at the end of August 2021.

Remove 534.04 Design Requirements and replace with:

The Department will supply the following documents as soon as they are completed and available:

A. Method of manufacture and material certificates.

Upon request from the Contractor, the Department will provide the following documents:

B. Design computations (bound and indexed).
C. Load rating computations and completed load rating form (bound and indexed).

Remove subsections 534.05 through 534.18 completely.

Remove 534.19 Handling, Storage and Transportation and replace with:

The Contractor shall submit a plan for how they plan to handle, store, transport, load, unload and erect the precast concrete units for review by the Department, at least 14 calendar days prior to moving them from the state supplied storage locations or taking delivery of the precast units directly from the Manufacturer.

Handle, store, and transport units in a manner as to eliminate the danger of chipping, cracks, fracture, and excessive bending stresses. Any units found damaged shall be subject to rejection.

Set precast units on one-half inch thick neoprene pads during transportation to prevent damage to the unit legs. Support stored precast units stored prior to erection, above the ground on dunnage in a manner to prevent twisting or distortion. Protect the units from discoloration and damage.

The Manufacturer shall repair any damage to the precast concrete units resulting from shipping to the project. The Contractor shall repair any damage resulting from handling the units after delivery. Repair shall be accomplished by saw cutting a minimum of one-half inch deep around the perimeter of the damaged area, removing any loose concrete out to the saw cut perimeter and installing a polymer-modified cementitious patching material, from the Department's QPL, per the manufacturer's product data sheet.

534.20 Installation of Precast Units from the Standard Specifications applies unchanged.

Remove 534.21 Method of Measurement and replace with:

Installation of State Supplied Precast Concrete Box Culverts will be measured as one lump sum, complete, in place, and accepted.

Remove 534.22 Basis of Payment and replace with:

The accepted installation of the Department supplied Precast Concrete Box Culvert will be paid for at the respective Contract lump sum price. The lump sum price shall include associated headwalls, toe walls, cut-off walls and appurtenances, and shall be full compensation for all labor, equipment, materials, professional services, and incidentals necessary for installing the precast concrete elements and accessories. Falsework, reinforcing steel, welded steel wire fabric, joint wrap, geotextile, repair material, grout, cast-in-place concrete fill or grout fill for anchorage of appurtenances will not be measured and paid for separately, but will be incidental to the lump sum pay item. Cast-in-place concrete, reinforcing steel in cast-in-place elements and waterproofing membrane will be measured and paid for separately, under the provided Contract Pay Items.

Excavation for precast structural concrete structures, including excavation below culverts for bedding and backfilling, will be measured and paid for as provided in Section 206, Structural Excavation.

When the minimum cover material extends above the subgrade line, the removal of the cover material necessary to complete the work will not be paid for directly, but shall be considered incidental to the precast structural concrete lump sum pay item.

Payment will be made under:

	Pay Item	Pay Unit
534.7101	Precast Concrete Box Culvert - State Supplied: Felts Brook Bridge	LS
534.7101	Precast Concrete Box Culvert - State Supplied: Felts Tributary Bridge	LS
534.7101	Precast Concrete Box Culvert - State Supplied: Snow Scooter Bridge	LS
534.7101	Precast Concrete Box Culvert - State Supplied: Critter Crossing #1	LS
534.7101	Precast Concrete Box Culvert - State Supplied: Eaton Tributary Bridge	LS
534.7101	Precast Concrete Box Culvert - State Supplied: White Tail Crossing Bridge	LS
534.7101	Precast Concrete Box Culvert - State Supplied: Snow Sled Bridge	LS
534.7101	Precast Concrete Box Culvert - State Supplied: Critter Crossing #2	LS

November 7, 2019

SPECIAL PROVISION
SECTION 534
PRECAST STRUCTURAL CONCRETE

Revise Paragraph 2 of 534.07 Quality Control to say:

Provide a copy of the Quality System Manual (QSM) to the Fabrication Engineer for review and approval.

Add the following Paragraph to 534.07 Quality Control:

QC staff shall be separate from production and shall not perform any production work.

Revise Sentence 1 in 534.17 Finishing Concrete to say:

Concrete Products shall be finished to meet the Standard Grade finish as described in the MNL-116.

SPECIAL PROVISION
SECTION 603
PIPE CULVERTS AND STORM DRAINS

603.12 Basis of Payment: This section shall be amended with the addition of the following:

Pay Item		Pay Unit
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
603.215	36 Inch Reinforced Concrete Pipe Class III	Linear Foot
603.41	24 Inch Reinforced Concrete Pipe Class IV	Linear Foot
603.43	36 Inch Reinforced Concrete Pipe Class IV	Linear Foot
603.471	60 Inch Reinforced Concrete Pipe Class V	Linear Foot
603.491	72 Inch Reinforced Concrete Pipe Class V	Linear Foot
603.53	96 Inch Reinforced Concrete Pipe Class V	Linear Foot

SPECIAL PROVISION
SECTION 604
MANHOLES AND CATCH BASINS

This section is amended by the addition of the following:

Description This work consists of constructing an Outlet Control Structure meeting the requirements of "Special Provision 615 – Underdrain Soil Filter".

Method of Measurement Measurement shall be in accordance with Subsection 604.05.

Basis of Payment Payment shall be in accordance with Subsection 604.06.

Payment will be made under:

Pay Item		Pay Unit
604.091	Catch Basin Type B1-P	EA

SPECIAL PROVISION
SECTION 604
MANHOLES, INLETS, AND CATCH BASINS
(Utility Vault)

Amend Standard Specifications Section 604 with the following additions:

604.01 Description

This item shall consist of all work shown on the Plans and described in this Special Provision. This Special Provision is limited to the work to install a precast H-20 load capacity, power junction box vault with 30" dia. frame/cover and drain. A short drain stub shall be provided from the vault. The continuation of the final drain to daylight will be provided by others. The utility vault work shall be coordinated with the Utility Conduit Underground bid item.

Utility vault installation shall consist of installing the precast concrete vault as noted on the Lambert Road Bridge Plans, approximately at Station 6+80±, 24'RT± on Lambert Road.

Included with this work is the installation of a short drain stub. The continuation of the final drain to daylight will be provided by others. Cap and mark end of drain stub.

604.02 Materials

The Contractor is responsible for the furnishing and fabrication of all material and associated hardware as shown on the Plans and described in this specification.

Precast concrete vaults shall have a compressive strength of 5,000 psi at 28 days, air entrainment of 4-6%, Grade 60 reinforcement steel, H-20 loading capacity, 30" dia. cast frame and cover.

Vaults shall have threaded inserts for pulling eyes located above knockouts.

Provide compacted clean crushed stone or gravel base.

604.021 Submittals

The Contractor shall, within 60 days following execution of the Contract, submit a list of materials which are to be installed. The list shall include the manufacturer, size, components, dimensions, and identifying number of each item. The list shall be supplemented by such data as may be required, including detailed scale drawings of proposed minor deviations from the Plans. The Contractor shall submit for review, design data and sample articles of the material proposed for use.

604.03 Construction Requirements

A minimum of two weeks prior to beginning vault installation work, a meeting shall be held with members of Versant, the MaineDOT Resident, and the Contractor to discuss and coordinate the work progression.

The Contractor shall be responsible for and shall repair all damage caused to underground drainage structures, utilities, or conduit, which are encountered during construction.

604.05 Method of Measurement

Special Work – Utility Vault shall be measured by the lump sum, complete and accepted.

604.06 Basis of Payment

All work for Special Work – Utility Vault will be paid at the contract lump sum price. Payment shall be full compensation for all materials, equipment, labor, and hardware necessary to install the vault. Payment for work shall include furnishing and installing gravel base; drain pipe; frame and cover; and excavation and backfill.

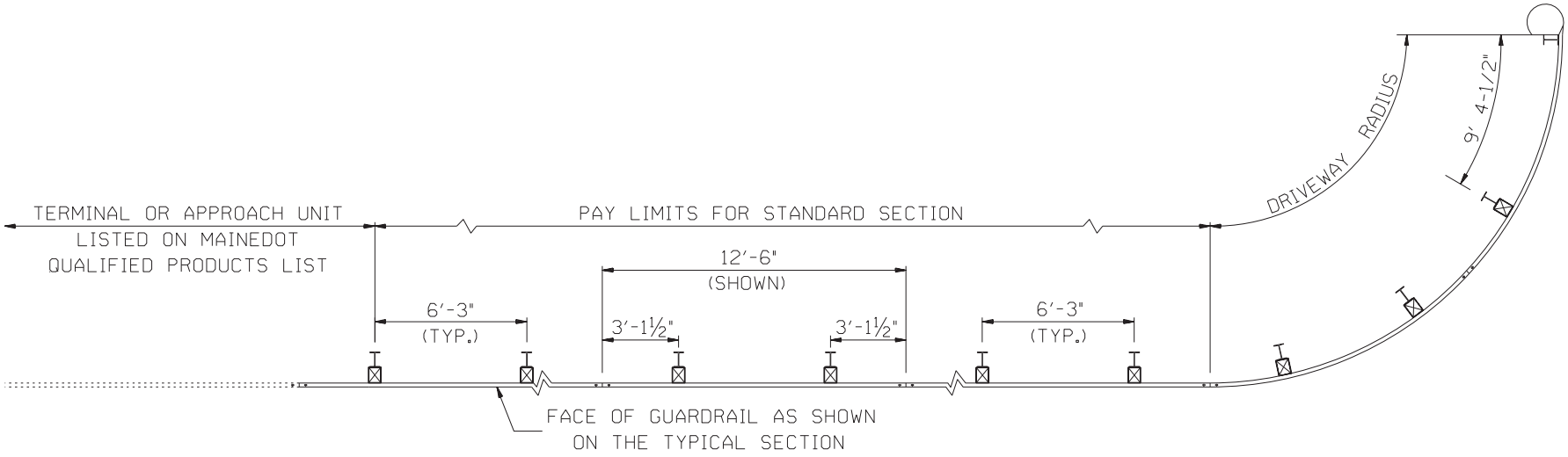
Pay Item		Pay Unit
604.1581	Utility Vault	Lump Sum

September 11, 2019

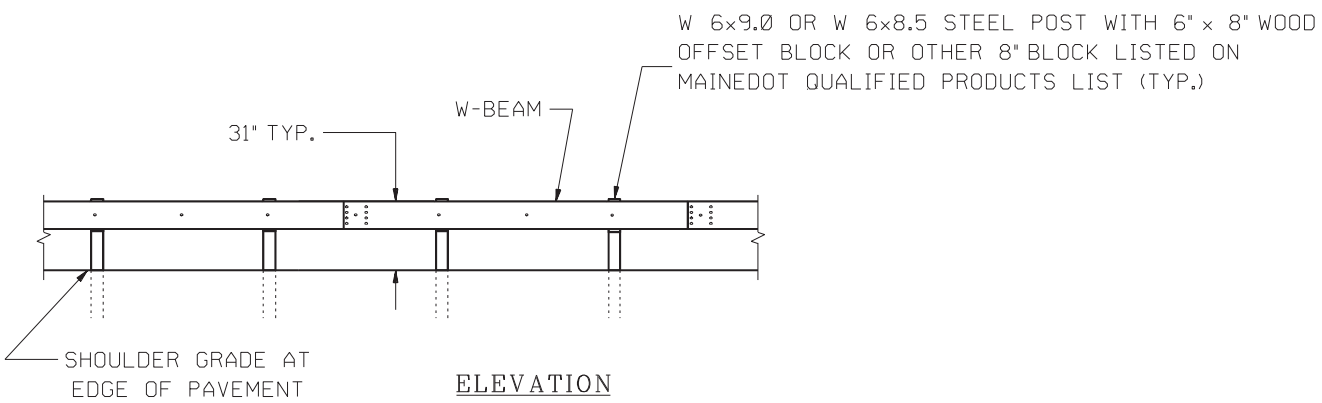
SPECIAL PROVISION
SECTION 606
GUARDRAIL

606.09 Basis of Payment: This section shall be amended with the addition of the following:

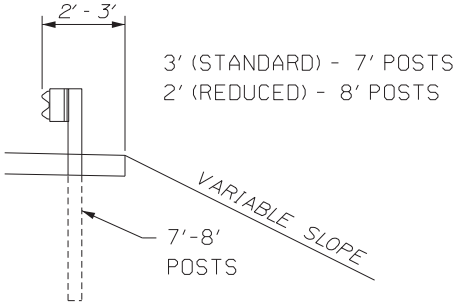
Pay Item		Pay Unit
606.1301	31" W-Beam Guardrail - Mid-Way Splice (Steel Post, 8" Offset Blocks, Single Faced)	Linear Foot
606.1302	31" W-Beam Guardrail - Mid-Way Splice (Steel Post, 8" Offset Blocks, Double Faced)	Linear Foot
606.1303	31" W-Beam Guardrail - Mid-Way Splice (Steel Post, 8" Offset Blocks, 15' Radius and Less)	Linear Foot
606.1304	31" W-Beam Guardrail - Mid-Way Splice (Steel Post, 8" Offset Blocks, Over 15' Radius)	Linear Foot
606.1305	31" W-Beam Guardrail - Mid-Way Splice Flared Terminal (31" Height)	Each
606.1306	31" W-Beam Guardrail - Mid-Way Splice Tangent Terminal (31" Height)	Each
606.1307	Bridge Transition (Asymmetrical) – Type 1A	Each
606.1308	Buried-in-Slope Guardrail End, Mid-Way Splice	Each



PLAN



ELEVATION



CROSS SECTION

31" W-BEAM GUARDRAIL - MID-WAY SPLICE

October 30, 2009

SPECIAL PROVISION
SECTION 606

BURIED-IN-SLOPE GUARDRAIL END

DESCRIPTION

The work shall consist of furnishing and installing a buried-in-slope guardrail end in accordance with this special provision and in conformance with the lines and grades shown on the plans. The work shall also include any excavation or backfill necessary for proper installation.

MATERIALS

Guardrail Components The guardrail components shall meet the requirements of Standard Specification 606 – Guardrail.

CONSTRUCTION REQUIREMENTS

Buried-in-slope guardrail end shall be constructed in accordance with the attached drawings and Specification 606 – Guardrail with the following additions:

- Height of guardrail shall be tapered down in elevation to maintain 44 inch maximum height.
- All posts shall be 8ft. in length from where the guardrail flares away from the road back to the anchor posts. Posts for the post anchor shall by 6ft. long.
- The post anchor shall be used. The Contractor shall inform the Engineer if an anchor alternative is proposed to be used. The contractor shall receive approval from the Resident, for any alternative anchor; prior to placement of guardrail.
- A minimum of 1ft. cover shall be placed over the post anchor. All backfilled material shall be compacted.

METHOD OF MEASUREMENT

Buried-in-slope guardrail end shall be measured for payment by each unit complete in place. The unit shall include but not be limited to the following guardrail components:

Component	***Item Number***	***Quantity***
Steel Post	PWE01-8ft. long	10
Steel Post Anchor	PWE01- 6ft. long	3
Offset Block	PDB01- modified	10
Galvanized Steel Plate	See attached drawings	13
"W" Beam Section	RWM04a	66.6 ft.
Rub Rail	RWM02	53.8 ft.

BASIS OF PAYMENT

The accepted quantities of buried-in-slope guardrail end shall be paid for at the contract unit price per each, complete in place. Such payment shall be full compensation for furnishing all material to assemble and all incidentals necessary to complete the work. All excavation, backfill grading and compaction required to complete the installation shall be included in the unit bid price for the item.

Payment will be made under:

Pay Item		Pay Unit
606.80	Buried-in-slope guardrail end	Each

SPECIAL PROVISION
SECTION 607.093
Deer Escape Jump Out

Description: This work shall consist of furnishing all labor, equipment and materials for constructing a retaining wall-supported earthen ramp that creates a one-way portal for deer or other wildlife to safely exit the highway right of way to reduce vehicle animal crashes.

Construction Requirements: New Deer Escape Jump Out construction shall consist of excavating; installing an approved retaining wall type; placing, grading, and compacting common borrow; dirty borrow; seeding; and mulching to the dimensions shown in the detail sheet, plans, and special provisions, or as directed by the Resident.

The Contractor shall submit a Deer Escape Jump Out plan at or before the Preconstruction Meeting, that identifies wall type and installation details. The Department will review for conformity with the Contract provisions and provide comments to the Contractor within 14 days of receipt of the plan. The development and modifications of the plan will be considered incidental to this item.

Materials: New Deer Escape Jump Outs will include, approved retaining wall (e.g. precast concrete, sheet pile, etc) common borrow, dirty borrow, seeding method # 2, mulch. Retaining wall and all materials shall meet the requirements specified in the applicable sections of the latest edition of the Department's Standard Specifications.

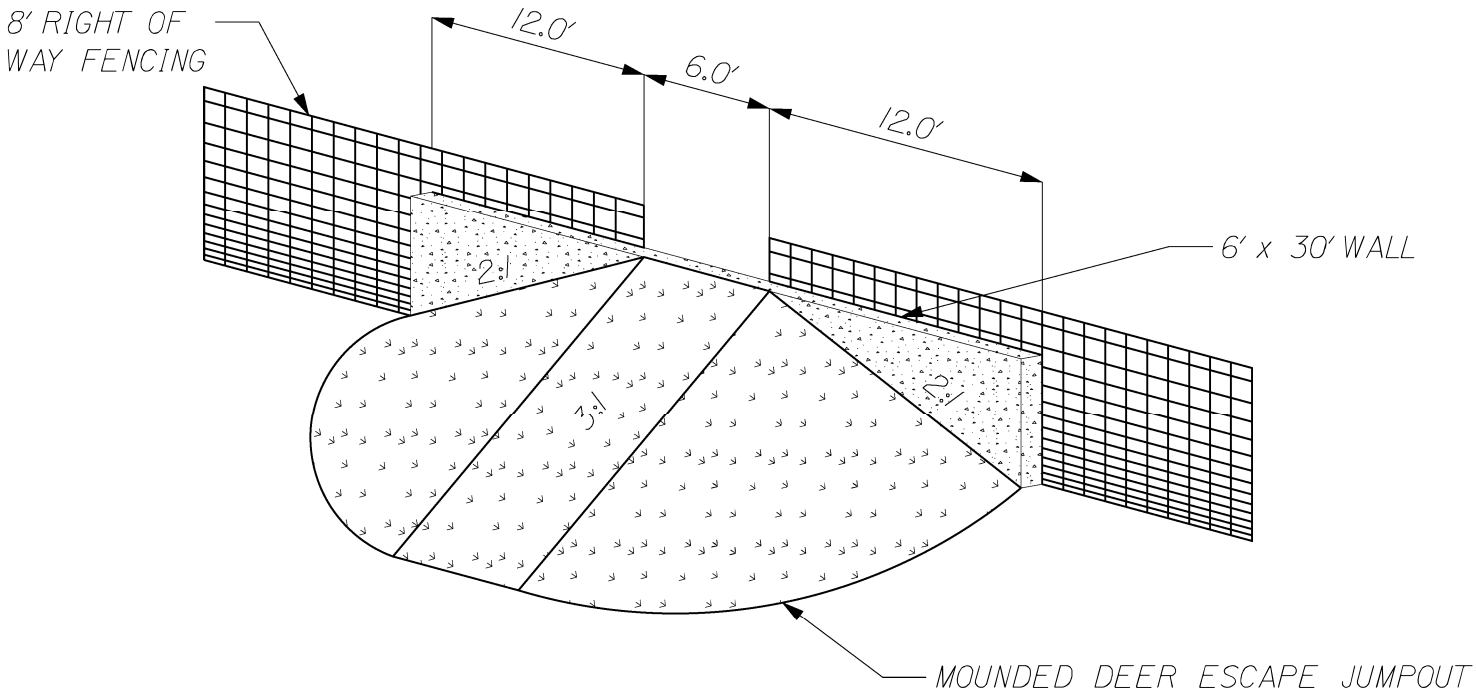
Common borrow	703.18
Dirty Borrow	615.10
Seeding Method # 2	618.14
Mulch	619.12
Retaining wall	appliable section

Basis of Payment: The accepted quantity of new constructed Deer Jump-outs will be paid for at the contract price per each complete and in place.

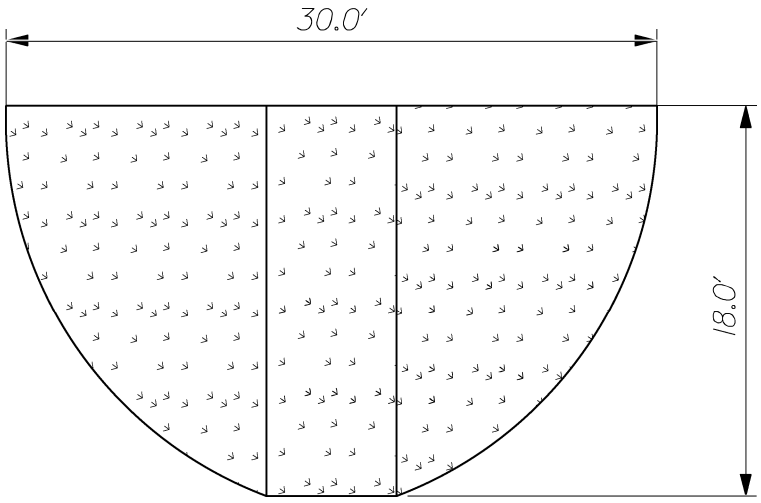
Payment will be made under:

Pay Item	Pay Unit
607.093 Deer Escape Jump Out	Each

607.093 DEER ESCAPE JUMP OUT



ISOMETRIC VIEW



PLAN VIEW

NOTES

1. THERE SHALL BE NO GAPS BETWEEN THE WALL AND THE RIGHT OF WAY FENCING
2. MOUND SHALL HAVE 2" DIRTY BORROW, AND BE SEEDED AND MULCHED
3. RIGHT OF WAY FENCING SHALL CONTINUE ALONG THE WALL, LOWERED TO 6' HIGH (INCIDENTAL TO THE ROW FENCE PAY ITEM)

NOT TO SCALE

SPECIAL PROVISION
SECTION 607
FENCES
(Chain Link Snow Fence)

607.01 Description The following paragraph is added:

This work consists of furnishing all materials for, and the construction of a chain link snow fence. The chain link snow fence shall be 36-inches tall and made from chain link materials as shown in the Plans and as specified herein.

607.02 Materials The following paragraphs are added:

Posts, rails, and braces shall be manufactured by one of the following methods with the steel conforming to ASTM A1011 or ASTM A1008 and A1011/A1011M with minimum yield strength 50 ksi:

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

The Piping shall conform to the following dimensions:

Nominal Diameter (Inches)	**Outside Diameter (Inches)**	**Minimum Wall Thickness (Inches)**	**Mass (Lb/ft)**
1 ½	1.900	0.145	2.72
2 ½	2.875	0.203	5.79

Hardware shall be hot dipped galvanized in accordance with AASHTO M 232 (ASTM A 153) or AASHTO M 298 Class 50 (ASTM B 695 Class 50).

The chain link fabric shall be 9-gauge steel, zinc coated conforming to AASHTO M 181 Type 1 Class D (ASTM A 392), aluminum-coated conforming to AASHTO M181 Type II (ASTM A 491), or 6-gauge aluminum alloy conforming to AASHTO M 181 Type III (ASTM F1183). Chain-link fabric shall be knuckled on top and bottom. The size of the wire mesh shall be 1 inch. Wire ties shall be standard round 9-gauge zinc or aluminum coated steel or 6-gauge aluminum alloy conforming to ASTM F 626. All ties shall be wrapped around chain-link fabric twice (double-pigtailed) at both ends. Space ties at 6″ on center to bottom rail and at 12″ on center at all posts and other rails. Mechanical or power fastened ties are acceptable.

607.06 Method of Measurement The following paragraph is added:

Chain link snow fence will be measured by the linear foot accepted in place and in conformity with the details shown on the Plans or as directed by the Resident.

607.07 Basis of Payment The following paragraph is added:

This work will be paid for at the contract unit price per linear foot, complete and accepted in place. Such price will be compensation for furnishing all materials, labor, equipment, coatings, and incidentals to complete the work.

Payment will be made under:

	Pay Item	Pay Unit
607.184	Chain Link Snow Fence 3′	Linear Feet

SPECIAL PROVISION
SECTION 609 – CURB
STRUCTURAL CONCRETE
(Slipform Concrete Curb)

609.01-Description This work shall consist of furnishing and placing Slipform Concrete Curb in close conformity with the plans, or as authorized by the Resident.

609.02 Materials Except as provided below, the materials used shall meet the requirements specified in Section 700 – Materials:

Portland Cement and Portland Pozzolan Cement	701.01
Water	701.02
Fine Aggregate for Concrete	703.01
Coarse Aggregate for Concrete	703.02
Air Entraining Admixtures	703.03

The aggregate shall conform to the requirements of Subsections 703.01 and 703.02.

A mix design for the Portland Cement Concrete shall be submitted to the Resident meeting the requirements of Class A or Class LP with the exception that permeability requirements shall be waived.
Entrained air content of Slipform curbing shall be 4.0% to 7.0%.
Partially discharged loads may be retempered with water provided the maximum water to cement ratio is not exceeded.
Maximum concrete temperature at placement shall be 90 F.
Proposed mix designs may contain polypropylene fibers.

609.03-General

a. Preparation of Base Before placing the curb, the foundation course shall be thoroughly cleaned of all foreign and objectionable material. The Contractor shall not place Slipform Concrete Curb on a wet or frozen base. Base pavement for placing epoxy resin binder and slipform curbing may be in an SSD condition but no standing water shall be allowed. String or chalk lines shall be positioned on the prepared base to provide guide lines. For HMA or PCC base the foundation shall be uniformly painted with an epoxy resin adhesive that meets AASHTO M 235, Type I, II, III, IV, or V. Proposed Epoxy Resin Adhesive from the Departments QPL shall be submitted with the concrete mix design for approval prior to placement and used in accordance with manufacturers recommendations.

b. Placing Concrete shall be placed with an approved Slipform machine that will produce a finished product according to the design specified in the plans. For cold weather Slipforming, the outside temperature must be at least 36°F (2.2°C) and rising. The curb shall be placed on a firm, uniform bearing surface, shall conform to the section profile specified in the plans, and shall match the appropriate grade. Expansion joints will be provided at ends of curve radii, or wherever the curb meets rigid structures such as building foundations or fire hydrants. Contraction joints will be placed at 10 foot (3 m) intervals using sawing methods, which shall cut 1-3" into the concrete. Joints shall be constructed perpendicular to the subgrade and match other joints in roadways, sidewalks or other structures when applicable.

c. Curing and Sealing Proper curing shall be insured through the use of either a combination curing/sealing compound spray that meets ASTM 1315Type 1-Class A, or a curing compound spray that meets ASTM 309 type 1-D – Class A. Curing may also be accomplished by the methods specified in Section 502.15 of the Specifications.

If a combination curing/sealing compound spray is not used, a separate sealing compound from the MaineDOT Qualified Products List for a Type 2 sealer shall be applied after the concrete has cured.

d. Protection Slipform curb must be adequately protected after placement. The concrete shall be allowed to cure for at least 72 hours. During cold weather conditions, when temperatures drop below the required temperature of 36°F (2.2°C) after placement, curbing shall be protected by concrete blankets or a combination of plastic sheeting and straw. After any placement of Slipform curb, regardless of weather conditions, the placed curb shall be adequately protected by traffic control devices as necessary.

e. Marking When required, the curb shall be painted and coated with glass beads in accordance with Section 627 - Pavement Marking. Curb designated to be painted shall not be sealed unless a combination curing/sealing compound is used.

f. Acceptance Curb shall be accepted or rejected based on finish, alignment, entrained air content, and compressive strength. Acceptance testing for air content and compressive strength will be under 502 Method C. All damaged curb shall be removed and replaced at the Contractor's expense.

609.04-Method of Measurement Concrete Slipform curb will be measured by the linear foot along the front face of the curb at the elevation of the finished pavement, complete in place and accepted.

609.05 Basis of Payment The accepted quantities of curb will be paid for at the contract unit price per linear foot as specified.

There will be no separate payment for concrete, sealing, incidental materials, or labor needed to install the curb, but these will be considered included in the work of the related curb.

Removal of existing curb and necessary excavation for installing curb will not be paid for directly, but shall be considered to be included in the curb pay item. Base and Subbase material will be paid for under Section 304 - Aggregate Base and Subbase Course. Backing up machine laid curb is incidental to the curb items. Loam, as directed, will be paid under 615 – Loam.

Payment will be made under:

Pay Item	Pay Unit
609.161 Concrete slipform curb - Vertical	Linear Foot
609.21 Concrete Slipform Curb	Linear Foot
609.214 Concrete slipform curb – 4’ terminal end	Each

SPECIAL PROVISION
SECTION 610
STONE FILL, RIPRAP, STONE BLANKET, AND STONE DITCH PROTECTION
(Void-Filled Riprap)

610.01 Description
This work consists of excavating for and constructing a protective covering of stone, with the voids filled by granular material.

610.02 Materials
Material for Void-Filled Riprap shall conform to the following requirements:

a. Approximately 3 parts by volume shall be Plain Riprap meeting the requirements of Standard Specifications Subsection 703.26.
b. Approximately 1 part by volume shall be Streambed Gravel meeting the requirements of Special Provision Section 203, Special Fill - Streambed Material.

The proportion of the Plain Riprap to Streambed Gravel may be modified by the Resident if it is apparent that insufficient gravel is included to fill all the voids or excess gravel is reducing the stability of the riprap. The Contractor shall premix the Plain Riprap and Streambed Gravel prior to placement.

The Contractor shall identify the source and proposed mix for inspection at least 10 working days prior to the start of stream channel construction. The grading of the stone portion of Void-Filled Riprap shall be determined by the Resident by visual inspection in accordance with the Standard Specifications Subsection 610.032d Inspection.

610.03 Construction Requirements
Void-Filled Riprap shall be placed full depth in one operation, approximately true to the required slope line and grade, and be uniform in appearance. Geotextile and bedding material placement shall comply with Standard Details 610(02)-610(04).

Prior to returning stream flow to the channel, the riprap shall be flooded to the maximum extent practical to compact the gravel material. Voids shall be filled by adding additional Streambed Gravel as filler material and flooding to wash the material in. If the top layer of material in either the streambed or banklines is too coarse to pond water on top, Common Borrow, Granular Borrow for Embankment, excavation, dredge, or other material with a significant proportion of fines and approved by the Resident shall be washed into the Void-Filled Riprap until the voids are filled and sealed so that water ponds on the surface.

610.04 Method of Measurement
Void-Filled Riprap will be measured by the cubic yard, complete in place.

610.05 Basis of Payment

Payment for Void Filled Riprap will be made at the contract unit price per cubic yard complete in place.

Costs of all required excavation below the slope line for the placement of bedding, riprap, and gravel fill material; and for furnishing and placing the bedding material itself; will be considered incidental to the contract item and no separate payment will be made. Water and filler material added to the Void Filled Riprap to fill voids shall be considered incidental to the contract item and no separate payment will be made.

	Pay Item	Pay Unit
610.213	Void-Filled Riprap	CY

WIN 18915.00
Brewer-Eddington
June 15, 2021

SPECIAL PROVISION 610
Stone Bermed Level Lip Spreader

Description This work shall consist of constructing a Stone Bermed Level Lip Spreader as a component for a stormwater quality filter buffers at a location designated on the plans and as specified in the Figure 1 below. These structures will be constructed in conjunction with Flow Splitters and Filter Buffers as shown on the Plans.

Preconstruction Site Walk The Contractor shall have a preconstruction site walk with the Resident and a representative of the Surface Water Quality Unit to review the proposed location and alignment and answer questions regarding layout and construction.

Materials All materials specified, except the berm stone shall be in accordance with existing standard specifications.

The berm stone for Stone Bermed Level Lip Spreaders must consist of sound durable rock that does not disintegrate by exposure to water or weather. Fieldstone, rough quarried stone, blasted ledge rock or tailings may be used. The stone must be well-graded within the limits provided in the table below or as otherwise approved by the Resident.

Sieve Designation (US Customary)	Percent, by Weight, Passing Square Mesh Sieve
12 in	100
6 in	84 - 100
3 in	68 - 83
1 in	42 - 55
No. 4	8 - 12

Construction

The Stone Bermed Level Lip Spreader shall be constructed at a location designated on the plans and as specified in Figure 1 of this Special Provision.

The area under Stone Bermed Level Lip Spreader and trapezoidal trough shall be grubbed and graded to form a firm base for. The surface under the Stone Bermed Level Lip Spreader will be excavated as shown in Figure 1. and common borrow shall be placed and compacted according to Highway Standards, Section 203.10 Embankment Construction - General and smoothed to form a firm continuous level surface with a continuous elevation equal to “Level Lip Spreader Crest Elevation” as shown in the Plans and approved by the Resident.

Trapezoidal trough on the upstream side of the level-lip spreader shall be shaped to the final dimension shown in Figure 1, seeded with Method 2, Item 618.14; and stabilized with Erosion Control Blanket, Item 613.319.

A 2 ft. wide by 3 ft. long apron shall be placed at the outlet of the inlet pipe from the Flow Splitter.

Method of Measurement

Erosion Control Blanket shall be measured by the square yard. Seed and the Stone Berm Level Lip Spreader shall be measured by the unit and cubic yard, respectively.

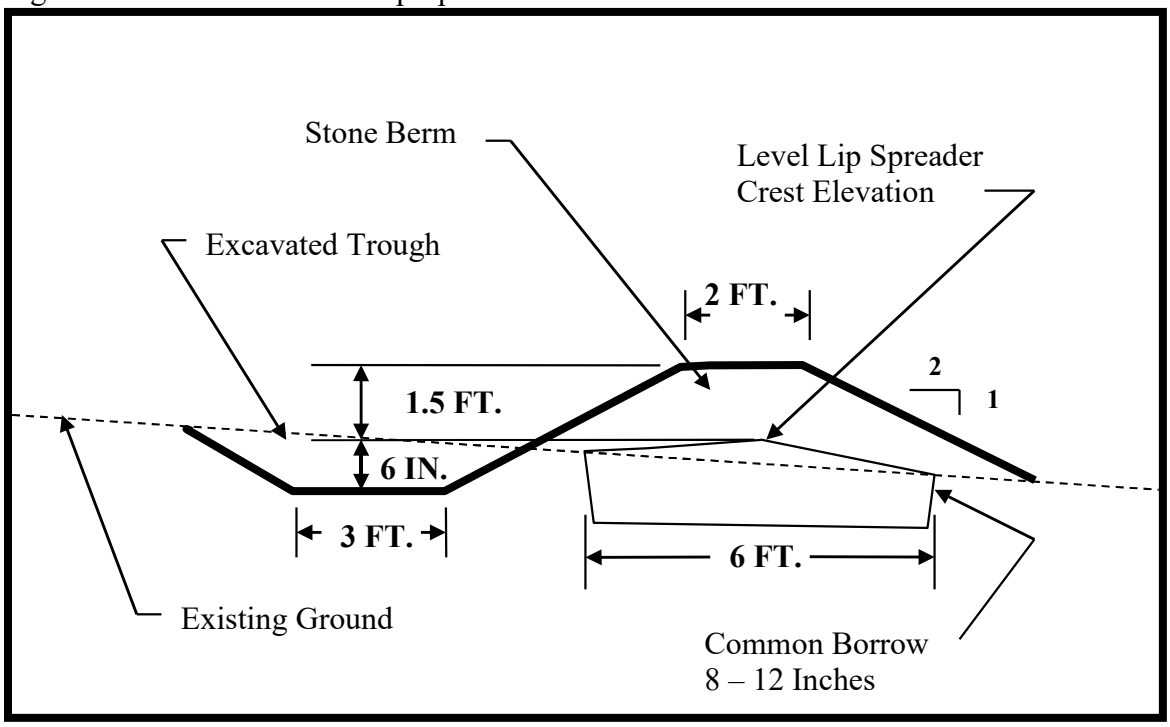
Basis of Payment

The accepted quantities of Stone Berm Level Lip Spreader, Seed, and Erosion Control Blanket will be paid for at the contract unit price. The flow splitter construction, trough excavation, and the berm control elevation mounding and compaction thereof shall be considered incidental to the Stone Berm Level Lip Spreader Pay Item and no separate payment will be made.

Payments will be made under:

Pay Item		Pay Unit
610.46	Stone Berm Level Lip Spreader	Cubic Yard

Figure 1. Stone Berm Level Lip Spreader



SPECIAL PROVISION
SECTION 613
(Turf Reinforcement Mat (TRM))

Supplement SECTION 613 – EROSION CONTROL BLANKETS with the following:

Description This work shall consist of furnishing and placing a Turf Reinforcement Mat (TRM) that is in reasonably close conformity with the locations called for on the Plans or as authorized.

Materials TRM shall be chosen from MaineDOT Qualified Products List of Environmental Items, Turf Reinforcement Mats, https://www.maine.gov/mdot/research/products/#category3. Type of the chosen TRM shall meet the minimum type specified on the Plans. TRM shall have a functional longevity more than 36 months.

Submittals The Contractor shall furnish the most recent manufacturer's product data sheet for the TRM for approval by the Resident at least ten (10) working days prior to the delivery of the material to the site. A sample of the mat may be requested at the discretion of the Resident.

Surface Preparation The surface to receive the TRM shall be prepared to relatively smooth conditions and free of obstructions, rocks, dirt clods, roots, stumps, depressions, debris, and soft or yielding areas. Erosion features such as rills, gullies, etc. shall be graded out of the surface before TRM deployment. The surface shall be lightly compacted to ensure that the TRM makes intimate contact with the soil. Overcompaction shall be avoided.

Installation The Contractor shall install the TRM in the area shown on the Plans and trench the TRM at the head of the slope according to the manufacturer's slope installation guidelines. Any technical questions concerning the installation shall be addressed to the manufacturer's representative or the representative from the MaineDOT Surface Water Quality Unit.

Maintenance and Inspections The Contractor shall inspect the installed TRM before and after storm events until vegetative cover is fully established, and to insure that the TRM has not moved or been dislodged from the underlying soil. Any failures shall be repaired immediately.

Method of Measurement Turf Reinforcement Mat will be measured by the square yard of exposed finished surface, not including roll overlaps or anchorage overlaps, complete and accepted in place.

Basis of Payment The accepted quantities of TRM will be paid for at the contract unit price per square yard, complete in place and accepted. Payment shall be full compensation for furnishing and installing the TRM, minor excavation for anchorage of the TRM, maintenance and repair or replacement of the TRM as required until final acceptance, and all equipment, labor and incidentals necessary to complete the work.

Payment will be made under:

	Pay Item	Pay Unit
613.40	Turf Reinforcement Mat (TRM)	Square Yard

SPECIAL PROVISION
SECTION 615
UNDERDRAIN SOIL FILTER

Amend Standard Specification 615 – Loam to include the following:

615.01 Description. This work shall consist of constructing Underdrain Soil Filters to provide stormwater quality treatment. Location, layout, grading, drainage, and seeding of the Underdrain Soil Filters are indicated on the Contract Drawings.

615.02 Materials. Materials for the Underdrain Soil Filters shall meet the requirements of the following sections of the Standard Specifications except as provided below:

Loam	615.02
Fine Aggregate for Concrete	703.01
Underdrain Backfill Material – Type B	703.22
PVC Pipe	706.08
PVC Perforated Pipe	706.09
Erosion Control Blanket	717.061
Drainage Geotextile	722.02
Engineered Soil Mix	See Below
Impervious Liner	See Below
Outlet Control Structure	See Below
Turf Reinforced Mat	See Below

Fine Aggregate for Concrete – Only the first paragraph and gradation table in Specification 703.01 apply. The remaining paragraphs do not apply.

PVC Pipe – In addition to Specification 706.08, PVC Pipe shall be unperforated.

Erosion Control Blanket – In addition to Specification 717.061, Erosion Control Blanket shall be minimum Type 3B and selected from the most recent version of MaineDOT "Rolled Erosion Control Products" list: https://www.maine.gov/mdot/research/products/#category3

Engineered Soil Mix – Engineered Soil Mix shall be a well-mixed batch contain the following components and proportions, measured by volume:

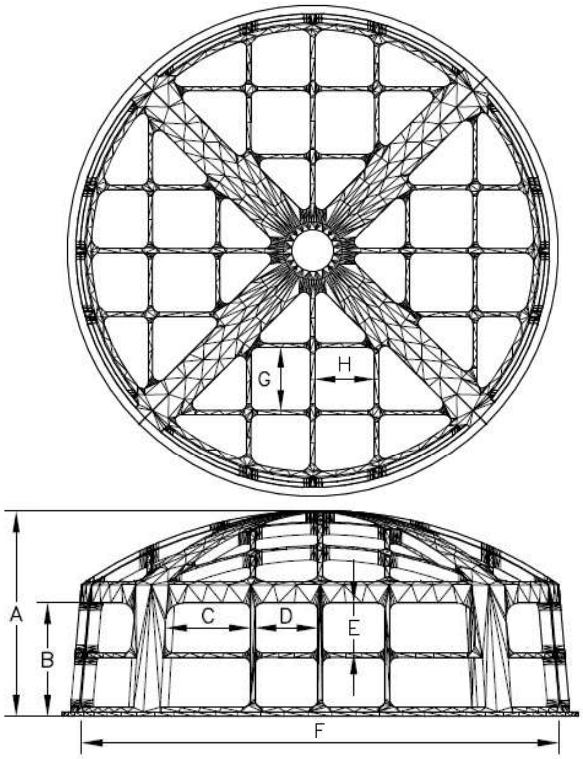
50% - Fine Aggregate for Concrete
20% - Loam
30% - Super Humus or Superhumus™ or equivalent as approved.

The Engineered Soil Mix shall have 8% to 12% by weight passing the #200 sieve, a clay content of less than 2% (determined hydrometer grain size analysis) and 5-10% dry weight of organic matter.

Impervious Liner – Impervious Liner shall consist of linear low-density polyethylene (LLDP) or PVC with a minimum thickness of 30 mils. Drainage Geotextile shall be installed on both sides of

the Impervious Liner.

Outlet Control Structure – Outlet Control Structure shall consist of a Catch Basin Type B1-P (Pay Item 604.091) and a round plastic trash rack. The catch basin shall have a minimum 30-inch diameter circular opening in the top slab. A round plastic trash rack meeting the dimensions and specifications shown below or an approved equal shall be installed on the catch basin. Open area of the trash rack shall be no less than 5 square feet.



Trash Rack Plan view (top) and side view (bottom).

StormRax Round Plastic Trash Rack (Plastic Solutions Inc.)

Part #	A	B	C	D	E	F	G	H
	inches							
RS-36	21 1/8	13 1/2	6 1/4	6 1/4	6 1/4	40 1/2	6 1/4	7 1/2

Turf Reinforcement Mat – Turf Reinforcement Mat shall conform to "Special Provision 613 – Turf Reinforcement Mat (TRM)". Turf Reinforcement Mat shall be minimum Type 5B and selected from the most recent version of MaineDOT "Turf Reinforcement Mats" list: https://www.maine.gov/mdot/research/products/#category3

615.04 Construction Requirements Each Underdrain Soil Filter shall be constructed according to the location, layout, grading, drainage, and seeding indicated on the Contract Drawings. The Contractor shall have a preconstruction site walk with the Resident and a representative from the MaineDOT Environmental Office Surface Water Resources Unit to review the proposed locations and to answer questions regarding layout and construction. Any modifications to the elevation,

location, and components of the Underdrain Soil Filters shall be at the direction of and approved by the Resident.

Following sequence shall be followed to construct the Underdrain Soil Filters from bottom up:

Where bedrock is encountered in the Underdrain Soil Filter excavations, the following groundwater drainage layer shall be placed on the subgrade, prior to the Underdrain Soil Filter Impervious Liner installation, as shown in the Plans and directed by the Resident:

- Install a 12-inch layer of Underdrain Backfill Material. PVC Perforated Pipe shall be installed at the center of this layer to provide a minimum 3-inch cover over the PVC Perforated Pipe. The Underdrain Backfill Material shall be compacted to between 90 and 92% standard proctor (AASHTO T180).

The Impervious Liner and Drainage Geotextile shall be installed on all sides and bottom over the drainage system. The Impervious Liner shall not exceed the top elevation of the Engineered Soil Mix. Drainage Geotextile shall be installed on both sides of the Impervious Liner to protect the liner from puncture and in accordance with the manufacturer's recommendations. Punctures in the Impervious Liner shall be repaired in accordance with the manufacturer's specifications and approved by the Resident. The Impervious Liner and Drainage Geotextile shall not be placed during the presence of excessive winds as directed by the Resident. The Impervious Liner and Drainage Geotextile shall be anchored to the sidewalls of the excavation using a method approved by the Resident.

Install an 18-inch underdrain layer consisting of Underdrain Backfill Material. PVC pipes (706.08 and 706.09) shall be installed as indicated on the Contract Drawings. Install an 18-inch layer of Engineered Soil Mix in 6-inch lifts to prevent pockets of loose media. The Underdrain Backfill Material and Engineered Soil Mix shall be compacted to between 90 and 92% standard proctor (AASHTO T180). Overcompaction of the Engineered Soil Mix shall be avoided.

Loam shall be placed on the side slopes of the Underdrain Soil Filter ponds as indicated on the Contract Drawings. Loamed side slopes and bottom of the filter ponds shall be seeded per the Standard Specification Section 618 Seeding Method #2 (Pay Item 618.14) supplemented with the Special Seed Mix Underdrain Soil Filter (Pay Item 618.1452). The seeding shall be completed between April 1st and June 15th or between August 15th and September 15th. Erosion Control Blanket shall be installed over the seeded areas prior to the end of each Working Day. Turf Reinforcement Mats shall be installed over the Underdrain Soil Filter spillway areas as indicated on the Contract Drawings.

615.041 General. Inspection of the Underdrain Soil Filters shall be provided for each phase of construction by the Resident with required reporting to the MaineDOT Environmental Office Surface Water Resources Unit.

615.042 Submittals. The following submittals are required:

- The Contractor shall identify the location of the source of each component of the Underdrain Soil Filters and provide documentation to the Resident. The Contractor shall submit samples of each material to be blended for the engineered soil mix, the resulting engineered soil mix, and underdrain bedding material to a material testing firm at least 30 working days prior to delivery to the site. Representative samples shall be a composite of three different locations (grabs) from the stockpile or pit face. Sample size required will be determined by the material testing firm. All laboratory test results (see below) shall be submitted to the Resident at least 10 working days prior to the delivery of material to the site. The cost of material testing shall be considered incidental to the Pay Item.
- Certification of the source of the Super Humus or Superhumus™ or equivalent.
- Submittals in accordance with individual material requirements set forth within the Standard Specifications.
- Method for anchoring of the impervious liner and drainage geotextile to the excavation walls.

615.043 Testing.

- Laboratory Testing - The Contractor's material testing firm shall conduct a sieve analysis conforming to AASHTO T88 on each of the engineered soil mix components, the resulting engineered soil mix, and underdrain bedding material. The material testing laboratory shall test the organic content of the resulting engineered soil mix and its components, the testing shall conform to AASHTO T267. The resulting engineered soil mix shall have 8% to 12% by weight passing the #200 sieve, a clay content of less than 2% and have 5-10% dry weight of organic matter.

- Permeability Testing – The Contractor's material testing firm shall perform a permeability test by constant-head method on the engineered soil mix conforming to AASHTO T215. One test per 1,000 square feet of engineered soil mix surface area of each Underdrain Soil Filter.

615.05 Method of Measurement. Underdrain Soil Filters will be measured for payment by the Lump Sum.

615.06 Basis of Payment. Underdrain Soil Filters will be paid for at the contract unit price as specified complete and in place.

Payment shall be full compensation for furnishing and placing all PVC pipe, underdrain backfill material, engineered soil mix, impervious liner, drainage geotextile, loam, turf reinforcement mat, erosion control blanket, and all equipment and labor, and all other incidentals to complete the work.

Excavation for the Engineered Soil Mix and the Underdrain Backfill Material will be considered incidental, except as provided in Section 206 – Structural Excavation.

Excavation and grading to establish final grade of the Underdrain Soil Filter embankments and floor elevation will be considered incidental.

Catch basin, standard seed mix, and special seed mix will be paid under the appropriate item numbers: 604.091, 618.14, and 618.1452, respectively. The trash rack will be considered incidental to the catch basin.

Payment will be made under:

Pay Item		Pay Unit
615.27	Underdrain Soil Filter	Lump Sum

SPECIAL PROVISION
SECTION 615.081
COMPOST BLANKET

Description

This work shall consist of furnishing and placing compost to create a uniform blanket (compost blanket) for seeding, in reasonably close conformity with the thicknesses and locations called for on the Plans or as authorized.

Materials

The recipe for the Compost Blanket shall be a one to one blend by volume of compost and loam meeting the following requirements:

The loam shall meet requirements of Section 615.02 Loam or as approved by the Resident.

The compost for the Compost Blanket shall meet the following requirements:

Compost shall be produced by the aerobic (biological) and biochemical decomposition of source separated organic materials.

Compost shall be derived from a mixture of the following feedstock materials:

1. Green material consisting of chipped, shredded, or ground vegetation, or clean processed recycled wood products (Maine Department of Environmental Protection (MaineDEP) Type IA, IB)
2. Manure
3. Mixed food waste (MaineDEP Type IB, IC)
4. Biosolids (MaineDEP Type II)

Compost shall not be derived from mixed municipal solid waste and must be reasonably free of visible contaminants. Compost shall not contain paint, petroleum products, pesticides, industrial residuals or any other chemical residues harmful to animal life or plant growth. Compost shall not possess objectionable odors.

The compost shall be produced at a licensed facility as specified under MaineDEP Chapter 410: Composting Facilities that regulates Solid Waste Facilities. If exempt from State permitting requirements, the composting facility shall certify that it follows guidelines and procedures for production of compost meeting the environmental standards of Chapter 410.

Compost shall meet the following parameters:

Parameter	Requirement
Acidity Range	5.5 pH to 8.5 pH
Moisture Content	30-60% wet weight basis
Organic Content	25-65% dry weight basis
Particle Size	100% passing 3 inches 90-100% passing 1 inch 65-100% passing ¾ inch 0-75% passing ¼ inch
Physical Contaminant	<1% dry weight basis
Soluble Salts	< 5.0 mmhos/cm
Carbon: Nitrogen Ratio	15-25:1
Total Nitrogen	<1.7%
Organic N	<1.5%
Total Phosphorus	<1.0%
Total Potassium	<0.5%
Stability	<8 mg CO_2-C per g OM per day

Maturity Test: The finished compost must be tested and classified as "Very Mature" by one of the following methods, or another method as approved by the resident:

Method	Units	Very Mature	Mature	Immature
Oxygen Uptake Rate (OUR Test)	O2 / unit TS / hr	<0.4	0.4 - 1.3	>1.3
Specific Oxygen Uptake Rate (SOUR Test)	O2 / unit BVS / hr	<0.5	0.5 - 1.5	>1.5
Dewar Self-Heating Test	Temp. rise (°C)	<10	10 - 20	>20
Solvita Test	Index value	7-8	5-6	<5

Compost shall conform to all applicable specification requirements prior to its final placement on the project. The practice of culling deleterious or out-of-specification material after placement and/or grading in place will not be allowed.

Submittal Requirements

The contractor shall provide MaineDOT with a 5-gallon compost sample at least 14 days prior to application for laboratory testing if deemed appropriate before use, and documentation from the compost supplier of the following information:

1. The source(s) of compost.
2. Laboratory results that show that the compost delivered to the project meets the compost parameters listed above. An independent Seal of Testing Assurance (STA) Program certified laboratory shall perform the analysis.
3. Compost supplier references documenting that they are fully permitted by MaineDEP to produce compost.
4. MaineDOT reserves the right to have an additional Soil Analysis Test to reject the material and request an alternative material that passes acceptable standards.

Batch Mix- Compost and Loam

Compost and Loam shall be combined in equal (1 to 1) portions, by volume and mixed to produce homogeneous product approved by the Resident.

Preconstruction Site Walk

The Contractor shall have a preconstruction site walk with the Resident and a representative from the MaineDOT Environmental Office Surface Water Resources Unit to review the installation area and to answer questions in regard to the layout and installation. The final locations and limits of compost blanket shall be laid out by the Contractor prior to installation for review and approval by the Resident.

Preparing Areas

All slopes and other areas where compost is to be placed shall be shaped to the required grade as shown in the Plans. The area shall be uniformly graded and be free of obstructions, rocks, clods, roots and soft or low-density pockets of material that could result in the concentration of surface water drainage. Prior to placing the compost blanket, the slopes shall be roughened by track-walking or rolling with a sheepsfoot roller.

Placing Compost Blanket

The Compost Blanket material (50% compost / 50% loam) shall be placed on the inslopes as shown in the Plans. The Compost Blanket shall be placed by the Contractor using conventional earthmoving equipment, distributed by hand using a shovel, by mechanical means such as a spreader unit (e.g., bulldozer, excavator, manure spreader), or pneumatic blower. The Compost Blanket shall be spread in a manner as to establish a loose, friable seed bed from the edge of the pavement to the toe of the slope except for the following sections:

- Sta. 276+50LT – Sta. 287+40LT: The Compost Blanket application width, as measured parallel to the slope, shall be 30 ft from the edge of the pavement,

- Sta. 276+00RT – Sta. 287+40RT: The Compost Blanket application width, as measured parallel to the slope, shall be 35 ft from the edge of the pavement,

The Compost Blanket shall be spread to the uniform final thickness of 2" for slopes 4:1 or less and 4" for slopes greater than 4:1 after light compaction with a 100 pound roller or other approved means after spreading with one of the aforementioned methods.

Seeding

The finished Compost Blanket shall be seeded using the "Seeding Hydromulch Growth Medium" per Special Provision 618.146. Areas shall be seeded the same Working Day as the placement of the Compost Blanket and before stabilization.

Stabilization

The Contractor shall maintain the Compost Blanket by repairing all damaged areas and by correcting all shifting of the blanket due to wind, water, or other causes. Erosion Control Blanket shall be installed over the seeded compost blanket prior to the end of each Working Day. Any additional disturbed soil stabilization shall be considered incidental to, and be completed in accordance with, Section 656.

Method of Measurement

Compost Blanket (50% compost / 50% loam mix) will be measured by the cubic yard complete in place after finishing to the required depths as shown on the plans or directed. Lateral measurements will be parallel with the slope of the ground. No additional payment shall be made for the disruption or replacement of any signage, utilities, or similar manmade items during Compost Blanket installation.

Basis of Payment

Compost blankets shall be paid for at the contract unit price per cubic yard, in place and accepted. No extra payment will be made for scarifying existing surface. Payment for the "Seeding Hydromulch Growth Medium" shall be made under Pay Item 618.146. Payment for Erosion Control Blanket shall be made under Pay Item 613.319. Payment for additional erosion control measures not explicitly mentioned in this special provision shall be considered incidental to the Temporary Erosion and Sediment Control item.

Payment will be made under:

Pay Item		Pay Unit
615.081	Compost Blanket	Cubic Yard

SPECIAL PROVISIONS
SECTION 618
LANDSCAPE
(Special Seed Mix Underdrain Soil Filter)

The following list provides a Special Provision Seed Mix to be used on the UNDERDRAIN SOIL FILTER areas of this project as shown in the plans and as directed by the Resident Engineer.

The Underdrain Soil Filter side slopes and bottom shall be seeded per the Standard Specification Section 618 Seeding Method #2 supplemented with the Special Seed Mix (Pay Item: 618.1452). The seeding shall be completed between April 1st and June 15th or between August 15th and September 15th to ensure adequate time for the grass to become established.

The Special Seed Mix shall be applied at the rate of 1/2 lb per unit [1,000 sq.ft.]

Underdrain Soil Filter Mix

28.5 %	Panicum virgatum	Switch Grass
28 %	Panicum clandestinum	Deer Tongue
10 %	Elymus canadensis	Canada Wildrye
10 %	Elymus virginicus	Virginia Wildrye
5 %	Carex scoparia	Blunt Broomsedge
5 %	Carex vulpinoidea	Fox Sedge
5 %	Poa palustris	Fowl Bentgrass
4 %	Agrostis perennans	Autumn Bentgrass
2 %	Calamagrostis canadensis	Canada Bluejoint
1 %	Juncus effusus	Soft Rush
1 %	Juncus tenuis	Path Rush
.5 %	Scirpus cyperinus	Woolgrass

Apply this mix at 20 lbs/acre with a cover crop.

For a cover crop use either grain rye (1 Sep to 30 Apr; 30 lbs/acre) or Japanese Millet (1 May to 31 Aug; 10 lbs/acre) or Barnyard Grass (1 May to 31 Aug; 10 lbs/acre).

Pay Item		Pay Unit
618.1452	Special Seed Mix Underdrain Soil Filter	UNIT [1,000 sq.ft.]

SPECIAL PROVISION
SECTION 618 - SEEDING
(Seeding Hydromulch Medium)

Supplement SECTION 618 - SEEDING with the following:

618.01 Description: This work shall consist of furnishing and installing Seeding Method Number 2 Highway Mix amended with Special Seed Mix (618.143), Biotic Soil Media (BSM), and High Performance-Flexible Growth Medium (HP-FGM) on the Compost Blanket (615.081) areas shown in the Plans.

618.02 Materials: The materials shall meet the requirements of the following sections of the Standard Specifications except as provided below:

Agricultural Limestone/Liquid Lime	717.02
Seed (Roadside Mixture #2)	717.03
Special Seed Mix	See Below
Biotic Soil Media (BSM)	See Below
High Performance-Flexible Growth Medium (HP-FGM)	See Below

The Special Seed Mix shall conform to the requirements of "Special Provision 618 – Special Seed Mix".

The **Biotic Soil Media (BSM)** shall conform to the following typical property values when uniformly applied at a rate of 3,500 lbs per acre under bench- or large-scale testing conditions:

Property	Test Method	Tested Value
Physical		
Organic Material	ASTM D586	≥ 94%
Mass Per Unit Area	ASTM D6566	≥ 11.6 oz/yd
Ground Cover	ASTM D6567	≥ 99%
Water Holding Capacity	ASTM D7367	≥ 900%
pH	ASTM D1293	6.0 ± 0.3
Carbon : Nitrogen (C:N) Ratio	ASTM E1508 & EPA Method 1687	50:1 ± 10
Material Color	Observed	Brown
Performance		
Cover Factor	Large Scale Testing	≤ 0.01
% Effectiveness	Large Scale Testing	≥ 99%
Vegetation Establishment	ASTM D7322	≥ 850%
Environmental		
Ecotoxicity	EPA 2021.0	48-hr LC_{50} > 100%
Biodegradability	ASTM D5338	Yes
EPA Metal Limits	EPA 503 Metal Limits	Pass
Pathogen Reduction	40 CFR 503 Class A Compost	Pass

All components of the **BSM** shall be pre-packaged by the manufacturer to assure both material performance and compliance with the following values.

1. Thermally Processed* Organic Fibers (within a pressurized vessel) – 89%

* Heated to a temperature greater than 380 degrees Fahrenheit for 5 minutes at a pressure greater than 50 psi

2. Proprietary Blend of high-viscosity colloidal polysaccharide biopolymers, biochar, seaweed extract, humic acid, endomycorrhizae and beneficial bacteria – 11%
3. Moisture Content – 12%

The **High Performance-Flexible Growth Medium (HP-FGM)** shall conform to the following typical property values when uniformly applied at a rate of 3,500 lbs per acre under bench- or large-scale testing conditions:

Property	Test Method	Tested Value
Physical		
Mass Per Unit Area	ASTM D6566	≥ 11.6 oz/yd
Thickness	ASTM D6525	≥ 0.22 inch
Ground Cover	ASTM D6567	≥ 99%
Water Holding Capacity	ASTM D7367	≥ 1,700%
Material Color	Observed	Green
Cover Factor	Large Scale Testing	≤ 0.01
% Effectiveness	Large Scale Testing	≥ 99 %
Cure time	Observed	0 - 2 hours
Vegetation Establishment	ASTM D7322	≥ 800 %
Functional Longevity	ASTM D5338	≤ 18 months
Ecotoxicity	EPA 2021.0	48-hr LC_{50} > 100%
Effluent Turbidity	Large Scale Testing	≤ 250 NTU
Biodegradability	ASTM D5338	Yes

All components of the **HP-FGM** shall be pre-packaged by the Manufacturer to assure both material performance and compliance with the following values. Under no circumstances shall field mixing of components be permitted.

1. Thermally Processed* (within a pressurized vessel) Virgin Wood Fibers – 80%
   *Heated to a temperature greater than 380 degrees Fahrenheit for 5 minutes at a pressure greater than 50 psi(345 kPa)
2. Wetting agents (including high-viscosity colloidal polysaccharides, cross-linked biopolymers, and water absorbents) – 10%
3. Crimped Biodegradable Interlocking Fibers – 5%
4. Micro-Pore Granules – 5%

No chemical additives except for fertilizer, soil neutralizers and biostimulant materials should be added to BSM or HP-FGM.

618.021 Delivery, Storage, and Handling Deliver materials and products in UV and weather-resistant factory-labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage, weather, excessive temperatures, and construction operations.

618.022 Application Method A mechanically agitated hydroseeding machine with fan-type nozzle (50-degree tip) or an equivalent approved equipment shall be used for the application. HP-FGM shall be applied from opposing directions to the soil surface to achieve optimum surface coverage. Follow a two-step process for HP-FGM application; a one-step application process can be followed upon consultation with the HP-FGM manufacturer's representative and approval of the Resident:

- Step One: Apply typically 50% of the specified seed mix with a small amount of HP-FGM for visual meeting. Do not leave the seeded surfaces unprotected, especially if precipitation is imminent
- Step Two: Mix balance of the seed and apply HP-FGM at a rate of 50 lbs per 125 gallons of water over freshly seeded surfaces. Confirm loading rates with the equipment manufacturer.

Strictly comply with BSM and HP-FGM manufacturer's mixing and installation instructions and recommendations.

618.03 Rates of Application: Lime and Roadside Mixture #2 shall be applied at the rates given in the Standard Specification Sections 618.03a and 618.03d, respectively**.** The BSM shall be applied at the rate of 3,500 lbs per acre/80 lbs per 1,000 sq. ft. [1 Unit], followed by dual applications of HP-FGM with seed at the total rate of 1,500 lbs per acre/ 35 lbs per unit. The Special Seed Mix shall be applied at the rate of 1/2 lb per unit with cover crop seed per the Special Provision 618.143.

The Compost Blanket between "Station 276+50 – 287+40 Left" and "276+00-287+40 Right" shall receive HP-FGM at the rate of 2,000 lbs per acre/ 46 lbs per unit.

618.04 Time of Initial Seeding: The seeding dates shall be April 1 to June 15 (Spring) or August 15 to September 15 (Fall).

618.10 Maintenance and Acceptance Maintenance and acceptance of seeded areas shall be as set forth in the Standard Specification Section 618.10.

618.11 Method of Measurement The Seeding Hydromulch Growth Medium shall be measured for payment as set forth in the Standard Specification Section 618.11.

618.12 Basis of Payment The Seeding Hydromulch Growth Medium will be paid for at the contract unit price per unit (1,000 square feet) complete in place and accepted. Payment for the Special Seed Mix will be made separately under Pay Item 618.143. All other materials will be considered incidental.

Payment will be made under:

	Pay Item	Pay Unit
618.146	Seeding Hydromulch Growth Medium	UNIT [1,000 sq.ft.]

SPECIAL PROVISIONS
SECTION 618
LANDSCAPE
(Special Seed Mix)

The following list provides a Special Provision Seed Mix to be used on the COMPOST BLANKET (615.081) areas of this project as shown in the plans and as directed by the Resident. In addition, refer to "Special Provision 618- Seeding Hydromulch Medium" for application methodology.

This mix shall be applied at the rate of 1/2 lb per unit [1,000 sq.ft.]

This mix shall be applied with Method 2 Highway Mix per "Special Provision 618-Seeding Hydromulch Medium".

Compost Blanket Storm Water Seed Mix

28 %	Panicum virgatum	Switchgrass
22.9 %	Panicum clandestinum	Deertongue
10 %	Elymus canadensis	Canada Wildrye
10 %	Elymus virginicus	Virginia Wild Rye
5 %	Carex scoparia	Blunt Broomsedge
5 %	Carex vulpinoidea	Fox Sedge
5 %	Poa palustris	Fowl Bluegrass
3 %	Verbena hastata	Blue Vervain
2 %	Agrostis perennans	Autumn Bentgrass
1.5 %	Asclepias incarnata	Swamp Milkweed
1 %	Eupatorium perfoliatun	Boneset
1 %	Juncus effusus	Soft Rush
1 %	Juncus tenuis	Path Sedge
1 %	Zizia aurea	Golden Alexanders
.7 %	Aster latifolius	Calico Aster
.7 %	Aster umbellatus	Flat Topped White Aster
.7 %	Solidago rugosa	Wrinkleleaf Goldenrod
.5 %	Asclepias syriaca	Common Milkweed
.4 %	Monarda fistulosum	Wild Bergamot
.3 %	Mimulus ringens	Square Stemmed Monkey Flower
.3 %	Scirpus cyperinus	Woolgrass

For a cover crop use either grain rye (1 Sep to 30 Apr; 30 lbs/acre) or Japanese Millet (1 May to 31 Aug; at the Rate of ¼ lb per unit [1,000 sq.ft.]

618.143 Seed All seed shall be certified as to mixture, germination, purity, and live seed.

A. Percent germination > 80 %
B. Pure live seed > 85 %
C. Percent Purity > 85 %

D. Weed seed <1 %E. All seed shall be from the current year's crop unless recent tests by an approved testing agency demonstrate the approved requirements are met.

Pay Item		Pay Unit
618.143	Special Seed Mix	UNIT [1,000 sq.ft.]

SPECIAL PROVISIONS
SECTION 618
SEEDING
(Special Seeding - Wetland Restoration)

The following list provides a Special Seeding Mix to be used in wetland restoration areas of this project as shown in the plans and as directed by the Resident Engineer. This Special Seeding only includes seed and mulch with no other additives.

Seed may be sown using either the conventional or hydraulic spray methods. The seed may be placed directly over existing ground without site preparation and shall be mulched the same day as sown. Hay mulch is not allowed. The Department will accept areas seeded once they have attained consistent growth of the perennial species with no sizable bare spots.

This mix shall be applied at the rate of 1/2 lb per unit. An additional cover crop of Barnyard Grass (Echinochloa muricata) shall be seeded at the rate of 10 lb/acre or ¼ lb per unit.

Connector Wetland Seed Mix

24 %	Carex vulpinoidea	Fox Sedge
20 %	Elymus virginicus	Virginia Wild Rye
10 %	Carex lupulina	Hop Sedge
10 %	Carex lurida	Lurid Sedge
10 %	Carex scoparia	Blunt Broom Sedge
4 %	Sparganium eurycarpum	Giant Bur Reed
4 %	Verbena hastata	Blue Vervain
3 %	Juncus effusus	Soft Rush
2 %	Asclepias incarnata	Swamp Milkweed
1.5 %	Eupatorium perfoliatum	Boneset
1.0 %	Bidens cernua	Nodding Bur Marigold
1.0 %	Carex comosa	Cosmos Sedge
1.0 %	Carex crinita	Fringed Sedge
1.0 %	Carex stipata	Awl Sedge
1.0 %	Cinna arundinacea	Common Woodreed Sedge
1.0 %	Glyceria striata	Fowl Mannagrass
1.0 %	Iris versicolor	Blueflag
1.0 %	Onoclea sensabilis	Sensitive Fern
0.8 %	Solidago rugosa	Wrinkleleaf Goldenrod
0.5 %	Aster novae-anglaeae	New England Aster
0.5 %	Aster puniceus	Purplestem Aster
0.5 %	Aster umbellatus	Flat Topped White Aster
0.3 %	Calamagrostis canadensis	Canada Bluejoint
0.3 %	Carex stricta	Tussock Sedge
0.3 %	Mimules ringens	Square Stem Monkeyflower
0.3 %	Scirpus cyperinus	Woolgrass

Payment will be made under:

Pay Item		Pay Unit
618.147	Special Seeding - Wetland Restoration	Unit

SPECIAL PROVISION
SECTION 620
GEOTEXTILES
(Drainage Geocomposite)

Description This work shall consist of furnishing and placing Drainage Geocomposite and Weep Hole Connections as specified herein, as shown on the plans, and as directed by the Resident. Geocomposite Drainage shall consist of a formed polystyrene core covered on one side with a non-woven, needle-punched polypropylene filter fabric.

Materials Drainage Geocomposite must be a composite system consisting of permeable geotextile and three-dimensional polymeric core providing equal flow in two perpendicular directions.

The Contractor shall furnish and install a Drainage Geocomposite as a hydrostatic water relief system. The Drainage Geocomposite shall be tied in to a water discharge system or weep holes. The weep holes shall be fitted with Weep Hole Connections, that effectively drain water from the geocomposite through the weep holes. The Weep Hole Connections may consist of Sitedrain AWD-102, Option 2 – Drain Gate connections, or equivalent.

Drainage Geocomposite work shall consist of furnishing all materials and labor required for placing and securing Drainage Geocomposite material, connection pipes, footing drains, weep holes and Weep Hole Connections, and horizontal drains, as shown on the Plans or as directed by the Resident.

Quality Assurance Testing Drainage Geocomposite must be backed by a Letter of Certification from the Manufacturer that the flow rate in the plane of the core meets or exceeds the specified flow given herein and determined by ASTM D4716.

Submittals The required submittals are as follows:

A. Submit Letter of Certification that material meets or exceeds physical properties per the following table.

B. The design layout of the Drainage Geocomposite including type, spacing, overlap, collection drainage, and other information.

Product Specification The Drainage Geocomposite shall consist of Miradrain 6000XL, Amerdrain 500, or equal that meets or exceeds the following properties:

TYPICAL PROPERTIES **Fabric Properties**	**Typical Value**	**Test Method**
Material	Non-woven Polypropylene	
Grab tensile strength	100 lbs	ASTM D4632
Puncture strength	65 lbs	ASTM D4833
AOS	70 sieve	ASTM D4751
Permeability	0.3 cm/sec	ASTM D4491
Core properties		
Material	Polystyrene	
Compressive strength	15,000 psf	ASTM D1621 (Mod.)
Product properties		
Flow capacity per unit width[1]	16 gpm/ft	ASTM D4716

[1] In Plane Flow Rate, Gradient = 1.0

All numeric values in the above table, except AOS, represent minimum average roll values in the weakest principal direction (i.e., average test results of any roll in a lot sampled for conformance or quality assurance testing shall meet or exceed the minimum values). Values for AOS represent maximum average roll values.

Placement Requirements The Drainage Geocomposite shall be installed by methods approved by the Manufacturer.

The installer shall place the Drainage Geocomposite at the elevations and alignment shown on the Plans, as noted and as directed by the Resident. The Drainage Geocomposite shall be installed with the fabric side toward the soil.

When installing the Drainage Geocomposite:

- Start at the low point of the wall and attach the panel to the wall.
- Weep Hole Connections shall be installed in conjunction with the Drainage Geocomposite.
- Adjacent panels may be:

  (1) Joined together with the lateral edge of the next/upper panel placed over the flanged edge of the lower panel;

  (2) Overlap the dimples of the preceding panel onto the dimples of the previous panel by 2 inches.

The Drainage Geocomposite from the adjacent panels shall overlap the preceding panel. The overlap fabric can be adhered with the Manufacturer's approved tape or duct tape. The Drainage Geocomposite shall be attached to non-waterproofed walls with contact adhesive, tape or concrete nails. The Drainage Geocomposite will be permanently secured prior to completion of backfilling. Backfilling shall be placed within seven days of Drainage Geocomposite installation. Backfill to at least 6 inches above the top edge of the Drainage Geocomposite.

The top or terminal edge of the Drainage Geocomposite shall be covered by applying a piece of filter geotextile, meeting the requirements of MaineDOT Standard Specification Section 722.03, over the edge sufficient in width to prevent soil or other foreign construction materials from intruding into or behind the Drainage Geocomposite panels.

If necessary, the Drainage Geocomposite and filter geotextile shall be positioned by hand to minimize wrinkles.

Unanticipated subsurface drainage features exposed in the excavation shall be drained independently of the Drainage Geocomposite.

Backfill Requirements Structural backfill as shown on the Plans shall be placed immediately against the Drainage Geocomposite. Care shall be taken during the backfill operation not to damage the geotextile surface of the drain. The backfill shall be placed and compacted in accordance with the project Plans and specifications. Care shall also be taken to avoid excessive settlement of the backfill material. The Drainage Geocomposite, once installed, shall not be exposed for more than seven days prior to backfilling.

Storage Requirements The Contractor shall check the Drainage Geocomposite upon delivery to ensure that the proper material has been delivered. The Contractor shall be responsible for the storage of the Drainage Geocomposite material at the site.

Drainage Geocomposite shall be provided in rolls wrapped with a protective covering and stored in a manner, which protects the material from temperatures greater than 140° F, mud, dirt, dust, and debris. Protective wrapping shall not be removed until immediately before the Drainage Geocomposite is installed.

Drainage Geocomposite material shall be delivered and stored in original packages bearing the Manufacturer's name. The fabric shall not be exposed to direct sunlight for more than seven days during its storage and installation. The Drainage Geocomposite material shall be stored in a clean, dry environment out of the pathway of construction equipment. Each roll of Drainage Geocomposite material shall be labeled to identify the production run.

Repair Requirements Prior to the placement of the Drainage Geocomposite each roll shall be inspected for damage resulting from construction.

Any ripped, torn, or damaged areas of the Drainage Geocomposite material shall be removed and patched by placing a patch large enough to cover the damaged area and provide a sufficient overlap on all sides to fasten. The patch shall be secured to the original Drainage Geocomposite material using the Manufacturer’s approved methods. If the hole width or tear width across the panel is more than 50% of the width of the material, the damaged area shall be cut out and the two portions of the Drainage Geocomposite material shall be joined in accordance with the placement requirement.

If the damage occurs to the Drainage Geocomposite material during shipping, handling, or installation, the damaged areas shall be cut out and a repair section of Drainage Geocomposite shall be installed at the Contractor's expense.

Method of Measurement Drainage Geocomposite installation shall be measured by the square yard in place and accepted. Measurements will not be made for overlaps, patches, and repairs.

Basis of Payment The accepted quantity of Drainage Geocomposite installed shall be paid for at the contract unit price per square yard, which shall be full compensation for off-loading, inspection, storage, materials, equipment, and any incidentals necessary to complete the installation.

The cost and placement of the drainage collection pipe will be incidental to the installation of the Drainage Geocomposite.

Payment will be made under:

	Pay Item	Unit
620.66	Drainage Geocomposite	Square Yard

SPECIAL PROVISION
SECTION 620 - GEOTEXTILES
(Reinforcement Geogrid)

Amend Standard Specification 620 – GEOTEXTILES to include the following:

620.01 Description This work shall consist of furnishing and installing Reinforcement Geogrid within the Culvert Bedding Stone in accordance with these specifications and in reasonably close conformity with the lines, grades, and dimensions shown on the plans or as directed by the Resident.

620.02 Material Reinforcement Geogrid shall consist of a regular network of integrally connected, polymeric tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil, aggregate or other material. The Reinforcement Geogrid structure shall be dimensionally stable to retain its geometry under construction stresses and shall have high resistance to damage during construction, ultraviolet degradation, and all forms of chemical and biological degradation encountered in the soil being reinforced.

The Reinforcement Geogrid shall meet or exceed the Minimum Average Roll Values (MARV) of the properties in Table 1. Acceptable manufacturers for Reinforcement Geogrids must be approved by the Resident.

Table 1 - Physical Property Requirements
(Biaxial Reinforcement Geogrid)

Reinforcement Geogrid Mechanical Property	Test Method	Minimum Average Roll Value (MARV)[1]
Tensile strength at 5% Strain MD or XD	ASTM D 6637	1,200 lb/ft
Rib Junction Strength	GRI-GG2	1,000 lb/ft in both directions
Aperture Openings		Between 0.75 and 3 inches
Percent Open Area		50 to 80%

[1] Values are minimum average roll values determined in accordance with ASTM D 4759

A biaxial Reinforcement Geogrid shall be used in this application.

620.03 Placement Reinforcement Geogrid shall be installed, in accordance with the manufacturer's recommendations, unless otherwise modified by this Special Provision. The Reinforcement Geogrid shall be placed within the layers of Crushed Stone Bedding at the proper elevation and alignment as shown on the Plans or as directed by the Resident.

1. The Reinforcement Geogrid shall be placed in continuous longitudinal strips. Splicing along the length will not be allowed. Reinforcement Geogrid shall be oriented such that the roll length runs either parallel or perpendicular to the construction centerline. The Contractor shall verify correct orientation of the Reinforcement Geogrid.

2. Reinforcement Geogrid may be temporarily secured in-place with staples, pins, sand bags or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the Resident.

3. Coverage of less than 100 percent shall not be allowed.

4. The Reinforcement Geogrid shall be lightly anchored and pulled taut to reduce any slack as directed by the Resident.

5. Fill shall not be dumped directly onto the Reinforcement Geogrid. It shall be dumped at the edge of the Reinforcement Geogrid or on a previous course of fill with a minimum compacted depth of 8 inches.

6. The Reinforcement Geogrid shall be covered with fill materials within 7 days of placement to protect against unnecessary exposure.

7. Fill may then be pushed onto the Reinforcement Geogrid using a track mounted bulldozer. At no time shall construction equipment be allowed directly onto the Reinforcement Geogrid. Track mounted equipment shall be allowed on previous courses of fill with a minimum compacted depth of 8 inches. Smooth drum roller compaction equipment shall be allowed on previous courses of fill with a minimum compacted depth of 8 inches and spread fill with a minimum depth of 12 inches, loose measure. At no time shall rubber tired or sheeps-foot rollers be allowed onto the reinforced fill. Turning of vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the Reinforcement Geogrid. Sudden breaking and sharp turning shall be avoided. Equipment speeds over 10 MPH shall not be allowed.

8. Placement, spreading, and compaction of soil on top of the Reinforcement Geogrid shall advance from one end of the Reinforcement Geogrid and move towards the other. Care shall be taken to minimize the development of wrinkles and to ensure that the Reinforcement Geogrid doesn't move from its position during fill placement. A spotter shall observe all fill placement operations to ensure the Reinforcement Geogrid does not slip, achieves the minimum coverage specified on the Plans, and is not damaged by the work.

9. Fill shall be compacted as specified in (1) the Standard Specifications or (2) to at least 95 percent of the maximum dry density determined in accordance with AASHTO T-180, whichever is greater. Density testing shall be made at a minimum frequency of one (1) test per lift or as otherwise specified in the Standard Specifications. Care shall be taken not to drive test apparatus through the Reinforcement Geogrid tensile elements.

10. All rutting formed during construction shall be filled with new Culvert Bedding Stone. In no case shall rutting be filled by blading down

620.04 Overlap Adjacent rolls of Reinforcement Geogrid shall be overlapped a minimum of 1 foot.

620.05 Seams Seams along adjacent lengths of Reinforcement Geogrid shall be tied together with hog rings or cable ties every 3 to 6 feet.

620.06 Certification Prior to construction the Contractor shall submit to the Resident the Manufacturer’s certification that the Reinforcement Geogrid supplied has been evaluated in full compliance with this Specification and is fit for long-term, critical soil reinforcement applications.

The Contractor's submittal package shall include, but not be limited to, actual tests for tension/creep, durability/aging, construction damage, and quality control tensile testing.

620.08 Shipment, Storage, Protection, and Repair of Fabric The Contractor shall check the Reinforcement Geogrid upon delivery to ensure that the proper material has been received. Each Reinforcement Geogrid roll shall be shipped in a protective bag and clearly marked with roll number, lot number, geogrid style and principle strength direction. During all periods of shipment and storage, the Reinforcement Geogrid shall be protected from temperatures greater than 140°F and all deleterious materials that might otherwise become affixed to the Reinforcement Geogrid and effect its performance. The manufacturer's recommendations shall be followed with regard to protection from direct sunlight. The Reinforcement Geogrid shall be stored off the ground in a clean, dry environment out of the pathway of construction equipment.

Any Reinforcement Geogrid damage shall be repaired or replaced in accordance with the manufacturer's recommendations. The Contractor shall replace any Reinforcement Geogrid damaged during installation at no additional cost to the Department.

620.09 Method of Measurement Reinforcement Geogrid will be measured by the number of Square Yards of surface area installed. Overlaps for connections, splices, patches, and repairs of damaged Reinforcement Geogrid, etc. are incidental to this Pay Item.

620.10 Basis of Payment Reinforcement Geogrid placement will be paid for per Square Yard in-place which shall be full compensation for all off-loading, inspection, storage, labor, materials, equipment, tools and any incidentals to complete the installation.

Payment will be made under:

Pay Item	Pay Unit
620.65 Reinforcement Geogrid	Square Yard

SPECIAL PROVISIONS
SECTION 621
LANDSCAPE

(Plant Species Specification and Quantities List)

The following list of items provides the estimated quantities for use on this project. The scientific name of the plant material is provided along with the common name in parenthesis.

The contractor shall follow ***Standard Specifications*** Rev. March, 2020 for landscape materials and installation procedures (sec. 621). All quantities/schedule subject t change. The Resident Engineer or ***MaineDOT*** Landscape Architect or designee will be available to inspect plant materials and inspect planting at that time. This list anticipates project needs and requirements but should be verified with the Resident Engineer or Landscape Architect prior to scheduling and planting prior to completion of the project.

No Landscape Warranty Bond will be required, two-year warrantee will be included incidental to planting.

ITEM	Description	Unit	Quant.	Total
621.025	Evergreen Trees 3' – 4' Group A B&B/Cont.	Ea.		10
	Pinus strobus (Eastern White Pine)		5	
	Picea glauca (White Spruce)		5	
621.026	Evergreen Trees 3' – 4' Group B B&B/Cont.	Ea.		10
	Abies balsamea (Balsam Fir)		10	
621.037	Evergreen Trees 5' – 6' Group A B&B	Ea.		10
	Pinus strobus (Eastern White Pine)		5	
	Picea glauca (White Spruce)		5	
621.038	Evergreen Trees 5' – 6' Group B B&B	Ea.		10
	Abies balsamea (Balsam Fir)		10	
621.043	Evergreen Trees 6' – 8' Group A B&B	Ea.		15
	Picea glauca (White Spruce)		5	
	Pinus strobus (Eastern White Pine)		5	
	Thuja occidentals 'Nigra' (Easter Red Cedar)		5	
621.044	Evergreen Trees 6' – 8' Group B B&B	Ea.		10
	(Abies balsamea) Balsam Fir		10	
621.129	Small Decid. Trees 6' – 8' Multistem Group A			10
	Betula allegheniensis (Yellow Birch)		10	
621.201	Med. Decid. Trees 2" – 2 ½" cal. Group A B&B			10
	Crataegus viridis 'Winter King' (Hawthorn)	Ea.	10	
621.54	Deciduous Shrubs 18"- 24" Container Group A			10
	Aronia arbitofolia (Red Chokeberry)		10	
621.546	Deciduous Shrubs 2'- 3' Container Group A			20
	Cornus sericea (Red Twig Dogwood)		10	
	Viburnum lentago (Nannyberry)		10	
621.552	Deciduous Shrubs 3' - 4' Group A			20
	Amelanchier canadensis (Serviceberry)		10	
	Salix discolor (Pussy Willow)		10	

Deciduous Shrubs 2'-3' Container

Brewer-Eddington
WIN 18915.00
August 14, 2021

SPECIAL PROVISION
SECTION 626
FOUNDATIONS, CONDUIT, AND JUNCTION BOXES FOR
HIGHWAY SIGNING, LIGHTING AND SIGNALS
(Precast Concrete Junction Box)

Section 626 of the Standard Specifications is amended by addition of the following:

626.035 Precast Concrete Junction Box

Precast concrete junction box metal frames and covers shall be grounded. Frame and cover shall be drilled and tapped. No. 6 AWGT bare copper wire shall be connected to the cover with a lug, leaving enough slack for the cover to be removed when necessary. Both frame and cover shall be drilled and tapped from the underside to avoid tripping hazard.

Brewer-Eddington
WIN 18915.00
August 14, 2021

SPECIAL PROVISION
SECTION 634
HIGHWAY LIGHTING
(Luminaires-LED)

634.093 Basis of Payment: This section shall be amended with the addition of the following:

Pay Item	Pay Unit
634.2042 LED Luminaires	Each

Highway Lighting Quality Control Checklist

Subsection 634.09 Field Testing

Project Pin # _____

Location (if multiple services, please be specific)- _____

Grounding Electrode Resistance at service _____

Number of Circuits _____

Hand-Off-Auto Switch? _____

Circuit #1

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

Circuit #2

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

I, _____, certify that this work was done in accordance with subsection 643.14 and current NEC _____ guidelines, and when tested, was functioning as intended.

(YEAR)

Electrician's Signature _____

Electrician's License # _____

Highway Lighting Quality Control Checklist

Subsection 634.09 Field Testing

Project Pin # _____

Location (if multiple services, please be specific)- _____

Grounding Electrode Resistance at service _____

Number of Circuits _____

Hand-Off-Auto Switch? _____

Circuit #3

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

Circuit #4

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

I, _____, certify that this work was done in accordance with subsection 643.14 and current NEC _____ guidelines, and when tested, was functioning as intended.

(YEAR)

Electrician's Signature _____

Electrician's License # _____

SPECIAL PROVISION
SECTION 639
ENGINEERING FACILITIES
(Geotechnical Instrumentation)

639.01 Description

The following is added to Subsection 639.01 of the Standard Specifications:

This work shall consist of furnishing and installing geotechnical instrumentation to facilitate monitoring the performance of highway, ramp, and bridge approach embankments in the following special embankment construction areas:

A. Area 1: mainline - Sta. 51+00 to Sta. 82+00; Ramp D – Sta. 900+00 to 909+00; Ramp E – Sta. 700+00 to Sta. 717+50; Ramp F – Sta. 800+75 to Sta. 815+67
B. Area 2: mainline – Sta. 138+00 to Sta. 143+50
C. Area 4: mainline – Sta. 179+25 to Sta. 186+00

The Contractor shall cooperate with the Resident (for the work of this section the term Resident will include the Geotechnical Engineer) at all times throughout construction as necessary for the instrumentation to be installed, initialized, and monitored. The Contractor shall provide the Resident access to instrumentation at all times throughout construction. The Resident will be responsible for initializing and monitoring instrumentation once the instrumentation has been installed by the Contractor to the satisfaction of the Resident. All instruments and data acquisition systems are to become property of the Department and shall not be decommissioned without authorization of the Department.

This work includes but may not be limited to the following:

A. Site preparation including subgrade stabilization.
B. Furnishing, fabricating, installing, maintaining, and protecting settlement platforms and protective barriers.
C. Extending settlement platforms/riser piping up through the embankment fill as the fill is placed and coordinating with the Resident so that the elevations of the riser piping can be surveyed prior to and after each extension is added.
D. Furnishing, installing, maintaining, and protecting vibrating wire piezometers.
E. Furnishing, installing, maintaining, and protecting inclinometers.
F. Furnishing, installing, maintaining, and protecting geotechnical instrumentation cabinets.
G. Allowing time for the Resident to adjust and/or test and initialize the instrumentation to confirm that it is functioning properly and that at least two (2) baseline readings have been collected prior to placement and compaction of sand blanket material (settlement platforms) and placement and compaction of embankment fill (vibrating wire piezometers and inclinometers).
H. Providing safe access and allowing time for the Resident to survey the settlement platforms, and read the inclinometers and vibrating wire piezometers during and throughout construction.

I. All geotechnical instrumentation shall be installed by the Contractor in the presence and under the direction of the Resident. Instrumentation that is installed without the Resident being present will not be accepted and replacement instrumentation shall be installed at no additional cost to the Department.

639.02 Materials

The following is added to Subsection 639.02 of the Standard Specifications:

All materials are to be provided by the Contractor unless specifically stated that an item will be provided by the Department.

Settlement Platforms

A. Settlement platforms (SPs) shall consist of 5-foot-long sections of 2-inch diameter black iron pipe, threaded at both ends (one pipe coupling for each length), and attached at the bottom to a 2-foot by 2-foot by 1.5-inch-thick, pressure-treated plywood base using a black iron floor flange, as shown on the Plans.
B. A black iron coupling shall be provided at the top of each SP riser pipe extension.
C. Protective barriers for SPs shall consist of an open ended, 4-ft tall concrete catch basin barrel section, or approved equal and shall be installed around each SP , as shown on the Plans.

Instrumentation Cabinets

The Contractor shall furnish and install geotechnical instrumentation cabinets (GICs) at the locations and to the specifications shown on the Plans. The GICs shall be resistant to the infiltration of water and shall be mounted on a 3-inch O.D. galvanized steel post. The bottom of the post shall be installed to a minimum depth of 5 feet below the ground surface at the time the post is installed and shall be restrained from lateral movement. Alternate cabinet mounting methods may be used by the Contractor, as approved by the Resident, provided exposed vibrating wire piezometer cables are protected from damage with conduit.

Vibrating Wire Piezometers

A. The Contractor shall furnish and install vibrating wire piezometers (VWPZs) with either one or two VWPZ sensors per location, as shown on the Plans.
B. VWPZs shall have a minimum range of 100 psi.
C. VWPZs, cables, and readout units shall be supplied by the same manufacturer. All VWPZs furnished and installed for this project shall be of the same make and model. The VWPZs and cable shall consist of one of the following:

GEOKON, Inc.	
Single-level VWPZ	Model: 4500S, Range: 1 MPa
Cable	Model: 02-250V6
Connectors	As specified by the manufacturer

RocTest, Inc.	
Single-level VWPZ	Model: PWS, Range: 0.75 MPa
Cable	Model: IRC-41A
Connectors	As specified by the manufacturer
Durham Geo Slope Indicator	
Single-level VWPZ	Model: 52611030, Range: 7 bar (100 psi)
Cable	Model: 50613824
Connectors	As specified by the manufacturer

A factory calibration shall be conducted on each VWPZ prior to shipment from the manufacturer to the Contractor.

The VWPZs require the following additional materials, which shall be furnished by the Contractor:

A. Aggregate for Sand Leveling: Aggregate for sand leveling shall be sand of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The aggregate shall meet the grading requirements of the following table.

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
⅜ inch	85-100
No. 200	0-5.0

B. 1.5-inch diameter, 18-inch-long slotted PVC screen (0.010-inch slots); one (1) for each individual VWPZ.
C. 1.5-inch diameter solid PVC top and bottom caps. The top cap shall have a drillhole of sufficient diameter for the VWPZ cable to pass through it; one top and bottom cap for each individual VWPZ.
D. Bentonite Pellets and Bentonite Powder.
E. Portland Cement.

Technical Representative. The manufacturer of the VWPZs shall supply a Technical Representative with expert knowledge on the VWPZs used, and who has at least four (4) years of experience with the installation and monitoring of VWPZs. On behalf of the Contractor, the Technical Representative shall:

A. Prepare detailed step-by-step installation, calibration and maintenance procedures for the VWPZs based on the general installation requiremnets provided in this Special Provision.
B. Be present during the installation of at least the first two (2) VWPZs in each of the three (3) special embankment construction areas shown on the Plans and listed above.
C. Conduct pre-installation and post-installation acceptance tests for at least the first two (2) VWPZs in each of the three (3) special embankment construction areas shown on the Plans and listed above. Pre-installation acceptance tests shall be completed after insertion of the sensor into the borehole but prior to grouting to ensure that the VWPZs

are operable and functioning properly. Post-installation acceptance tests shall be completed after the trench has been excavated, instrumentation cables have been run in the trenches from the VWPZ location to the GIC, and cables have been wired into the GIC, but prior to trench backfilling to ensure that the VWPZs are operable and functioning properly.

D. Confirm the factory calibration before installation of the VWPZs.
E. Remain on site until the Resident feels that the Contractor is sufficiently skilled to install the VWPZs without instruction from the Technical Representative.
F. Explain the calibration curves and/or equations for the VWPZs to the Contractor, Resident, to ensure that the method of determining the pore water pressure is understood.
G. Be on site until the completion and acceptance by the Resident of the tasks outlined above and subsequently be available for consultation at all times for the duration of the contract.
H. Extend VWPZ cables from the ground surface at the VWPZ locations to the GICs and wire the VWPZ cables into the GICs. Each VWPZ cable shall be clearly marked so that the Resident know which VWPZ cable(s) are associated with each installed VWPZ.

VWPZ Cables

The length of VWPZ cable shall be sufficient to extend from the VWPZ locations to the GICs shown on the Plans, with a minimum additional length of three (3) feet. Cables shall be clearly marked for positive identification. Prior to ordering the VWPZs and associated cable the Contractor shall submit proposed cable lengths for each VWPZ to the Resident for review. The Contractor shall not order VWPZ and associated cables until after the submittal has been reviewed by the Resident and all comments have been resolved to the satisfaction of the Resident.

Data Acquisition System

The data acquisition system shall be designed such that the VWPZs can be read directly from the GICs. The system shall be manufactured by the same commercial source as the VWPZs. The data acquisition system shall consist of one of the following:

GEOKON, Inc.	Models: 1) Terminal Box (Model No. 4999) and 2) Handheld Readout Unit (Model No. GK-404)
RocTest, Inc.	Models: 1) Terminal Box (Model No. FODL-1600) and 2) Handheld Readout Unit (Model No. MB-3TL)
Durham Geo Slope Indicator	Models: 1) Terminal Box (Model No. 52615180) and 2) Handheld Readout Unit (Model No. 52613500)

The connectors at the ends of the VWPZ cables shall be compatible with the data acquisition system. The Contractor shall provide the manufacturer's warranty for each data acquisition system and the data acquisition systems shall become property of the Department.

The Contractor shall furnish a minimum of one (1) terminal box at each GIC, and a total of two (2) readout units for this project.

Inclinometers

A. Inclinometer casing shall be 2.75-inch O.D. ABS casing with four (4) grooves machined at 90 degrees. Provide bottom and top caps so that inside of installed inclinometer casing is dry and free of debris. Protect each inclinometer with a steel guard pipe that extends a minimum of three (3) feet above existing grade, with a lockable watertight top cap.
B. The inclinometer probe, readout unit, cable and pulley assembly will be provided by the Department.
C. Bentonite-cement grout shall consist of uniform-sized fine ground or powdered non-drilling mud grade bentonite, for use in grouting inclinometer casings. A polymer-based thixotropic additive may also be added to the mix if recommended by the manufacturer. Thoroughly mix the water and cement first, followed by the bentonite. Use a minimum of 30 pounds of bentonite for every 94 pounds of cement. Bentonite-cement grout shall have a mixed specific gravity, prior to placement within the borehole, of between 1.03 and 1.10.

639.05 Submittals

The following is added to the Standard Specifications:

A minimum of 30 calendar days prior to the start of site work activities, the Contractor shall submit an Instrumentation Quality Control Plan (QCP) to the Resident, for review. At a minimum, the QCP shall contain the following information:

A. Measures to be employed by the Contractor to mark and protect all instrumentation from damage at all times throughout the entire duration of the project.
B. The Contractor shall identify the individual(s) on the Contractor's staff permanently assigned to the job, who is/are competent and shall act on behalf of the Contractor, who shall be responsible to coordinate with the Drilling Contractor and Technical Representative during any instrumentation installation and/or monitoring work. This individual shall be responsible for ensuring that the instruments are protected at all times during construction. This individual shall also be responsible for immediately notifying the Resident if any damage (actual or potential/suspected) to an instrumentation device occurs at any time during construction and coordinating installation of replacement instrumentation.
C. Instrumentation models and manufacturers.
D. Proposed Drilling Contractor.
E. Any installation methods that vary from what is specified here in Subsection 639.06
F. Detailed step-by-step VWPZ installation based on the general installation procedure provided in this Special Provision and maintenance procedures for the VWPZs.
G. The certificate of calibration shall provide proof that the VWPZs have been calibrated in accordance with the manufacturer's calibration requirements and that the calibrations are traceable to the National Institute of Standards and Technology.

Calibration of the VWPZs shall be performed for increasing and decreasing loading, temperature conditions, and barometric pressure, when applicable, for at least two (2) cycles. The manufacturer shall supply a calibration curve and/or equation for each VWPZ, which allows for the pore water pressure to be quickly calculated, either by manufacturer-supplied, product-specific software or computer-based spreadsheet software. A unique identification number shall be marked on each VWPZ and corresponding calibration curve and/or equation.

639.06 Instrumentation Installation Requirements

The following Subsection is added to the Standard Specifications:

Instrumentation Cabinets

The Contractor shall install GICs for the VWPZs at the locations shown on the Plans. Alternate installation methods and locations may be used by the Contractor, subject to review and approval by the Resident, provided exposed VWPZ cables are protected at all times throughout the entire duration of the project.

Settlement Platforms

Settlement platforms and protective barriers shall be furnished, fabricated, and installed by the Contractor at the locations shown on the Plans. The Resident reserve the right to revise settlement platform locations during construction at no additional cost to the Department. The Contractor shall provide all labor, equipment, and materials necessary to extend the settlement platforms up through the embankment fill as the fill is placed in accordance with the requirements of this Special Provision.

Settlement platforms shall be installed by the Contractor before drainage layer placement and Prefabricated Vertical Drain (PVD) installation is complete. The placement and compaction of the drainage layer may not proceed until after the settlement platforms have been installed and a minimum of two (2) baseline surveys have been made on each installed settlement platform by the Resident. The baseline surveys will be completed within one calendar week of settlement platform installation and survey of as-drilled location and elevation (by the Contractor). The Contractor shall not proceed with earthwork activity until verbal notice is provided by the Resident that the baseline settlement platform surveys have been completed.

The Contractor shall add vertical lengths of black iron riser pipe sections as needed during embankment fill placement. The Contractor shall notify the Resident when they plan on adding sections of riser pipe at any settlement platform location so that the Resident can survey the top of the riser pipe before and after the next section of riser pipe is added. The Contractor shall cooperate with and provide safe access to the Resident at all times to allow these measurements to be made. The Contractor shall coordinate their scheduling accordingly and shall not proceed with additional fill placement within 100 ft of the settlement platform until the Resident has completed surveying the top of new riser pipe sections.

The Contractor shall furnish, construct, install, and maintain barriers around each of the settlement platforms shown on the Plans to provide protection to the settlement platforms during and throughout the entire duration of construction.

Vibrating Wire Piezometers

VWPZs shall be furnished and installed by the Contractor at the locations and elevations shown on the Plans. The Resident reserves the right to revise VWPZ locations and elevations during construction based on the actual subsurface conditions encountered during installation, at no additional cost to the Department. The Contractor shall provide all labor, drilling equipment and materials necessary to install the VWPZs. Drilling for and installation of VWPZs shall be completed by one of the following Drilling Contractors:

Northern Test Borings, Inc. (Gorham, ME)	Telephone: 207-839-9880
New England Boring Contractors (Hermon, ME)	Telephone: 207-848-7041

The drilling for and installation of VWPZs shall be performed in accordance with the requirements of this Special Provision and the information provided on the Plans.

VWPZs shall be installed by the Contractor after PVD installation is complete. The placement and compaction of embankment fill may not proceed until after the VWPZ cables have been installed and extended to the GICs shown on the Plans and a minimum of two (2) baseline readings have been made on each installed VWPZ by the Resident. The baseline readings will be completed within one week of VWPZ installation and survey of as-drilled location and elevation. The Contractor shall not proceed with placement and compaction of embankment fill until verbal notice is provided by the Resident that the baseline VWPZ readings have been completed.

The Contractor shall install VWPZs in accordance with the requirements outlined below and shown on the Plans. The Contractor shall include in the Instrumentation QCP any proposed variations of the below requirements, for review.

A. VWPZs shall be installed after site clearing activity is complete, the sand drainage layer is placed, prefabricated vertical drain installation is complete, and a stable surface is provided for instrumentation equipment and crews.
B. VWPZ locations shall be marked on the working surface with stakes. Each VWPZ stake shall be clearly marked with the individual VWPZ designation (see Plans) and a clear means of visually distinguishing each from PVD, settlement platform, and inclinometer locations, as approved by the Resident.
C. A 4-inch diameter borehole shall be advanced using schedule HW, flush joint casing. Casing shall be advanced by driving a 300-lb hammer falling 16 inches. Split-spoon sampling shall be conducted at 5-foot intervals, or as directed by the Resident during drilling, to the bottom of the marine clay stratum, as determined by the Resident. Sampling shall be completed using a 1-3/8-inch ID split-spoon sampler, driven with a 140-lb hammer falling 30 inches at intervals determined by the Resident. Anticipated VWPZ elevations are shown on the Plans.

D. Flush borehole with clean water.
E. Place a minimum 1 foot thick layer of bentonite pellets from the bottom of the borehole to 1 foot below the bottom of the deepest VWPZ sensor location.
F. Install the first VWPZ sensor within a 2-foot column of filter sand per manufacturer's recommendations. At least 12 inches of sand shall be placed above the top of the VWPZ sensor.
G. Conduct pre-installation acceptance test.
H. Place a bentonite pellets and Portland Cement grout above the filter sand to 1 foot below the bottom depth of the second VWPZ sensor as shown on the Plans. Portland Cement grout shall be placed using tremie methods only.
I. Install the second VWPZ, if required, within a 2-foot column of filter sand per manufacturer's recommendations. At least 12 inches of sand shall be placed above the top of the VWPZ.
J. Place a 1-foot layer of bentonite pellets above the filter sand.
K. Grout remainder of borehole with Portland cement grout.
L. Withdraw temporary drill casing during installation.
M. Run VWPZ cables in a trench cut in subgrade from the installed VWPZ location to the GIC location as shown on the Plans. VWPZ cables shall not be laid taught such that the cables are able to extend as needed to accommodate as much as 50 in. of vertical movement.
N. An additional 3 feet of cable (minimum) shall be provided for each VWPZ lead and shall be neatly arranged within the GIC. Each cable shall be clearly marked with the corresponding VWPZ designation as shown on the Plans. The trench shall be filled with granular fill as shown on the Plans.
O. O. Conduct post-installation acceptance test prior to backfilling the trench from the VWPZ locations to the CIG.

Inclinometers

Inclinometers shall be furnished and installed by the Contractor at the locations shown on the Plans. The Contractor shall provide all labor, equipment and materials necessary to install the inclinometers. Drilling for and installation of inclinometers shall be completed by one of the following Drilling Contractors:

Northern Test Borings, Inc. (Gorham, ME)	Telephone: 207-839-9880
New England Boring Contractors (Hermon, ME)	Telephone: 207-848-7041

Inclinometers shall be installed by the Contractor after PVD installation is complete. The placement and compaction of embankment fill shall not proceed until after the inclinometers have been installed and a minimum of two (2) baseline readings have been made on each installed inclinometer by the Resident. The baseline readings will be completed within one week of inclinometer installation and survey of as-drilled location and elevation. The Contractor shall not proceed with placement and compaction of embankment fill until verbal notice is provided by the Resident that the baseline inclinometer readings have been completed.

The Contractor shall install inclinometers in accordance with the requirements outlined below. The Contractor shall describe in the Instrumentation QCP any proposed variations of the below requirements, for review.

A. Install a minimum 4-inch diameter borehole to the minimum depths shown on the Plans.
B. Orient one set of grooves of inclinometer casing perpendicular to the alignment of the embankment toe.
C. Inclinometers shall be installed to within 2% of vertical inclination. Casing groove orientation shall be maintained throughout installation. The casing shall not be twisted inside the grouted borehole to achieve orientation.
D. Provide a cap at the top of the inclinometer inner casing to prevent debris from entering the casing. Remove any debris that enters the casings. Replace inclinometer if it becomes blocked or unusable due to the Contractor's activities at no additional cost to the Owner.
E. Provide a bolt through the inclinometer inner casing 2 feet above the bottom of the casing to serve as a repeatable start point for each inclinometer reading. Provide a cap at the bottom of each inclinometer casing. Wrap all joints and penetrations in the inclinometer casing with duct tape or other to provide watertight seal. Grout the annular space between the inner casing and the drill hole with bentonite cement grout in accordance manufacturer recommendations. Grout shall extend over the full height of the inclinometer and shall be placed using tremie methods only.
F. After completion of installation, a post-installation acceptance test shall be performed by the Resident to verify that there is no grout in the inclinometer casing, that groove orientation and verticality are correct, and that the inclinometer probe tracks correctly in all four orientations. First use a dummy probe to verify track performance. Then check deviation from vertical using a vertical inclinometer probe. Finally, use a spiral sensor to verify any spiral deformation of the casing grooves is within the specified tolerance. Contractor will be responsible for any lost or damaged readout instruments.
G. The Contractor shall construct and maintain the same type of barrier shown on the Plans around each inclinometer to provide protection to the inclinometers during and after construction.

As-Installed Instrumentation Information

After completion of installation, the as-installed plan location of each of settlement platform, VWPZ and inclinometer shall be determined by the Contractor using conventional survey methods. The settlement platform ground surface elevation (at time of installation), elevation of top of inclinometer casing, horizontal coordinate location, and station/offset information shall be provided to the Resident for each instrument prior to drainage layer (settlement platforms) or embankment fill (vibrating wire piezometers and inclinometers) placement within 200 ft of each instrument. As-built location in horizontal position shall be determined to an accuracy of +/-0.03 foot, and elevation to an accuracy of +/-0.01 foot.

Damage to Instrumentation

Due to the nature of the site and proposed construction, geotechnical instrumentation will be located within or close to the limits of work. The Contractor or the Technical Representative will complete pre- and post-installation acceptance tests. The Resident will monitor the instrumentation devices regularly after the pre- and post-installation acceptance tests have been completed and prior to, during and after embankment construction to evaluate embankment stability, settlement, and strength gain of the marine clay underlying the embankments. It is critical that the Contractor protect each instrumentation device from damage at all times throughout the entire duration of the project. The Contractor shall employ all means necessary to protect the instrumentation. Such protective measures may consist of, but are not limited to, the placement of protective barriers, caution marking tape and flagging around the installations. Caution markings shall be clearly visible from construction equipment used to construct the embankments.

The Contractor shall immediately notify the Resident of any potential damage, disturbance, or movement of any instrumentation device including after the pre- and post-installation acceptance tests. The Contractor shall immediately discontinue all earthwork activities within a 200-foot radius of a damaged instrument. Instrumentation that is judged inoperable by the Resident after the pre- or post-installation acceptance tests or is damaged by the Contractor as a result of construction activities and is judged to be inoperable by the Resident and shall be replaced within 72 hours, to the satisfaction of the Resident at no additional cost to the Department. Earthwork activities adjacent to a damaged instrument may resume per the direction of the Resident. As stated above, the occurrence of damaged instrumentation will result in stoppage of construction activity in the area of the damaged instrument. Such delays, if required, will be imposed at no additional cost to the Department.

Fill Placement and Compaction Near Instruments

Placement and compaction of sand drainage material and embankment fill within 3 feet of settlement platform riser pipes, VWPZs and inclinometers shall be accomplished by hand in a manner approved by the Resident. Compaction in these areas shall be accomplished using approved self-propelled vibratory plate compactors.

Sequence and Estimated Time for Installation of Instrumentation

The Contractor shall review the geotechnical information provided on the Plans and in this Special Provision for the location, installation details, monitoring durations, and instrumentation threshold values.

639.07 Monitoring of Instrumentation

The following Subsection is added to the Standard Specifications:

The Contractor shall be advised that the Resident will monitor the instrumentation devices regularly and often prior to, during, and after embankment construction to evaluate embankment stability, settlement, and strength gain of the marine clay underlying the embankments. The specific frequency at which the Resident will monitor the instruments will vary between several times per day and weekly depending on construction activity and other

factors. The Contractor shall cooperate with and provide safe access to the Resident at all times to allow these measurements to be made. The Contractor shall coordinate their schedule accordingly to allow the Resident to collect measurements.

It is brought to the Contractor's attention that if data obtained from the instrumentation indicate insufficient strength gain within the marine clay, or indicate signs of embankment instability, construction may be temporarily stopped by the Resident, and placement of additional embankment material suspended. The Resident may at such time request additional corrective actions be taken by the Contractor, as necessary. The instrumentation threshold values shown on the Plans will be used by the Resident to determine if construction and/or the placement of additional embankment material needs to be temporarily stopped or suspended. The corrective action specified by the Resident shall be performed by the Contractor at no additional cost to the Department.

639.071 Anticipated Surcharge Durations

The following Subsection is added to the Standard Specifications:

Anticipated preload-surcharge durations for the embankments in the three (3) special embankment construction areas listed above are provided on the Plans. Please note that the information provided on the Plans represent anticipated durations based on the results of technical evaluations completed during the design phase of the project; the actual durations may vary and will be determined by the Resident based on actual instrumentation data collected during construction.

639.08 Decommissioning of Instrumentation

The following Subsection is added to the Standard Specifications:

Instrumentation decommissioning shall be completed by the Contractor only after approval in writing by the Resident. Instrumentation shall be decommissioned as follows:

A. Geotechnical Instrumentation Cabinets: terminal boxes shall be removed and returned to the Department. The remainder of the geotechnical instrumentation cabinet and post shall be cut off 1 ft below finished grade.
B. Settlement Platforms: riser pipes shall be grouted and cut off at the bottom of the roadway section (at roadway section subgrade).
C. Vibrating Wire Piezometers: conduits housing vibrating wire piezometer leads shall be capped.
D. Inclinometers: inclinometer casing shall be grouted and cut off 1 ft below finished grade.

639.10 Method of Measurement

The following is added to Subsection 639.10 of the Standard Specifications:

Instrumentation (geotechnical) provided in accordance with Plans, Specifications and Special Provisions will be measured by Lump Sum.

639.11 Basis of Payment

The following is added to Subsection 639.11 of the Standard Specifications:

Settlement platform instrumentation will be paid for at the Contract Lump Sum price which shall be full compensation for all labor, materials, and equipment required to install, extend, protect, and replace (if necessary) the settlement platforms and associated items described in this Special Provision and shown on the Plans.

Vibrating wire piezometer and inclinometer instrumentation will be paid for at the Contract Lump Sum price which shall be full compensation for all labor, materials, and equipment required to install, extend, protect, and replace (if necessary) the vibrating wire piezometers,inclinometers, and instrumentation cabinets and associated items described in this Special Provision and shown on the Plans.

Removal and replacement of instrumentation damaged by the Contractor shall be incidental to the work. Time required for the Contractor to allow installation, maintenance, and measurement of instrumentation by the Resident shall also be incidental to the work.

Payment will be made as follows:

Pay Item		Pay Unit
639.261	Instrumentation (Geotechnical)	Lump Sum

SPECIAL PROVISION
SECTION 643
TRAFFIC SIGNALS

643.871 Weigh-In-Motion System This item of work shall conform to this specification. This item shall consist of furnishing, installing, calibrating, and testing a permanent Weigh-In-Motion System that includes traffic counting and classification capabilities. The system shall provide axle counts, vehicle classification, and vehicle weight for vehicles in motion at the location shown on the plans or as indicated by the Engineer.

MATERIALS: The Weigh-In-Motion (WIM) System shall meet the following requirements:

1. The WIM System shall include a concrete pad-mounted ITS Equipment Cabinet in accordance with Special Provision 654.31.
2. The WIM System shall include a fiber optic Ethernet switch for communications in accordance with Special Provision 654.311.
3. The WIM System shall consist of Kistler piezo-electric sensors with a minimum of two un-aligned sensors per travel lane.
4. The WIM System shall consist of 6’ x 6’ inductive loop detectors with a minimum of two loops per travel lane. Each 6’ x 6’ inductive loop shall be made from four turns of IMSA loop duct and centered in the travel lane.
5. The loop wire shall be connected to loop lead-in cables at the pull box located nearest to the roadway. Loop lead-ins shall be twisted and aluminum shielded.
6. The WIM System shall consist of a rack mounted WIM controller (HERA) as provided by Electronic Control Measure (ECM) only. The controller shall be capable of measuring:
    a. Vehicle counts via axle counts
    b. Axle spacing
    c. Traffic speed
    d. FHWA vehicle classification
    e. Vehicle length
    f. Axle weights
    g. Wheel weight distribution (left and right sides)
    h. Gross vehicle weight
7. The WIM System shall be grounded with a minimum of four ¾” x 10’ long solid copper or copper-clad steel ground rods.

CONSTRUCTION:

8. All equipment, installation, and incidental work shall conform to the latest edition of the NEC and ITE Standards for traffic control equipment.
9. Each traffic lane shall be managed and measurable independently.
10. Loop detectors shall be installed in accordance with Section 643.05 in an arrangement as shown on the attached detail.

11. Sensors shall be 2 meter quartz sensors by Kistler Corp of 75 John Glenn Drive of Amherst, NY. Sensors will not require any temperature compensation.
12. Piezo-electric sensors shall be installed in accordance with the manufacturer's recommendations in an arrangement as shown on the attached detail. Centerline sensor must be located in advance of the shoulder sensor in the direction of travel.
13. Saw cuts for sensors shall be 2 inches deep and 3/8-inch wide.
14. Saw cuts shall be separate for loop wire and sensors to the pull box.
15. Prior to installing loop sealant, wires should be held to the bottom of the saw cut by Styrofoam backer rod.
16. After sensor grout and loop sealant has been cured, the excess grout and sealant shall be ground to be level with the pavement surface.
17. Piezo sensors shall be dynamic sensors designed for speeds between 35 mph and 60 mph with an accuracy of five percent (+/- 5%).
18. Data Storage: The traffic data shall be stored in SD card flash memory for access through an Ethernet port.
19. The Contractor shall furnish and install a Category 6 (Cat6) cable to connect the WIM controller to a fiber optic Ethernet switch, which shall be installed in the ITS Equipment Cabinet.
20. Power Supply: The WIM equipment shall be configured for operation at 120VAC.
21. Communications Protocol: The WIM controller shall include TCP/IP (XML format) and FTP protocols for data file retrieval.
22. The WIM controller shall be supplied with the number of detection panels required for the site plus one additional detection panel as a spare.
23. The WIM data shall be configured to work with MaineDOT's existing weigh-in-motion system data.
24. The WIM equipment shall be calibrated in accordance with the manufacturer's recommendations.
25. Contact the MaineDOT WIM Program Coordinator (Ron Cote) prior to installation. He can be reached by phone at 207-446-2305

METHOD OF MEASUREMENT: Weigh-In-Motion System shall be measured for payment by the lump sum installed, calibrated, tested and accepted in place.

BASIS OF PAYMENT: The Weigh-In-Motion System will be paid for at the contract lump sum price, which payment will be full compensation for furnishing and installing all loop wire and lead-ins, sensors, WIM controller hardware and software, grounding, saw cuts, sealant and grout, cables, calibration, testing, and for all tools, equipment, labor, and incidentals necessary for a complete installation.

Payment will be made under:

Pay Item		Pay Unit
643.871	Weigh-In-Motion System	Lump Sum

SPECIAL PROVISION
SECTION 645
HIGHWAY SIGNING

645.3065 Fiber Optic Delineator This item of work shall conform to this specification and MaineDOT Standard Specification Section 645.062. This item shall consist of furnishing and installing fiber optic delineators at the locations indicated in the plans or as directed by the Resident. This item shall also consist of furnishing, installing, terminating, and testing tracer wire for underground fiber optic communications conduit.

MATERIALS: The materials for this work shall conform to the following requirements:

1. Fiber Optic Delineators shall be white polyethylene of the minimum sizes and dimensions shown in the plans and manufactured specifically for the intended purpose of marking below-ground fiber optic cable and conduit.
2. Fiber Optic Delineators shall have an orange, 360-degree domed top marker, approximately 18 inches in length, with the message: "Warning Fiber Optic Cable – Before Excavating or in an Emergency Call Transportation Management Center 207-624-3339."
3. When the Fiber Optic Delineator is also a tracer wire termination point, the Fiber Optic Delineator shall have an orange 360 degree identification tag added to each terminus of the tracer wire with the message: "Warning Tracer Wire System – Before Excavating, Call Transportation Management Center 207-624-3339."
4. The delineators shall have a double anchor tube system to secure the marker in the intended locations shown in the plans or as directed by the Resident.
5. Tracer wire shall be a continuous insulated conductor that can be "toned" to locate dielectric fiber optic cable within non-ferrous conduit.
    a. Tracer wire shall be a 19 AWG tin-coated solid copper conductor, surrounded by a nominal 6 mil thick polyethylene insulation meeting ASTM D1248-16 and be suitable for direct burial and directional boring applications.
    b. The tracer wire insulations shall be surrounded by a woven polyester strength element with water blocking polyester yarns. The strength element shall have a minimum tensile strength of 1800 pounds.
    c. The tracer wire shall include a nominal 30 mil thick, abrasion-resistant outer jacket made of high density polyethylene (HDPE). The nominal diameter of the HDPE outer jacket shall be 0.25 inches.
    d. The HDPE outer layer shall have sequential length markings in units of feet. The HDPE outer layer may be orange or red in color.
    e. Tracer wire shall be rated at 600 volts operating per UL 1581.
    f. The tracer wire system shall include connectors for performing butt splices, lateral splices, and tracer equipment connections. Connectors shall be provided by the same manufacturer as the tracer wire.
    g. The tracer wire shall be detectable at depths of up to 6 feet below finished grade regardless of top material.

CONSTRUCTION:

6. The Contractor shall auger a hole of sufficient width and depth as recommended by the delineator manufacturer to install the Fiber Optic Delineator and double anchoring system.
    a. Holes shall be backfilled with suitable material as approved by the manufacturer in layers not over 6 inches in depth and thoroughly compacted. If unsuitable materials are found during the hole excavation, the backfill shall consist of new fill material as approved by the Resident.
7. The Fiber Optic Delineator shall include a termination block for access to the tracer wire at all locations where the Fiber Optic Delineator is installed within 25 feet of a fiber optic splice vault.
8. All tracer wire equipment connection points shall be installed in a watertight enclosure a minimum of 36 inches above grade, and shall be external to pull boxes, splice vaults and manholes. Tracer wire equipment connection points may be installed inside equipment cabinets, provided the tracer wire enters the cabinet through a conduit specifically installed for that purpose.
9. Tracer wire shall be placed in the same trench as the associated conduit. Tracer wire shall be placed above the associated conduit within 12 inches of the fiber conduit for the full length of the conduit from termination to termination.
10. The tracer wire shall be installed in a continuous run. Splicing of tracer wire may only occur in fiber optic splice vaults and in ITS equipment cabinets. Underground splices will not be allowed. When splicing the tracer wire to pre-existing tracer wire of differing sizes, connectors manufactured specifically for that purpose shall be utilized. The connectors shall be installed following manufacturer recommended installation methods.
11. Tracer wire equipment connections shall be installed at the end points of all tracer wire runs, or as shown on the plans or directed by the Engineer. No single run of tracer wire shall exceed 2,000 feet without intermediate connection points.
12. All tracer wire equipment connection points shall be connected to a grounding system, with a maximum resistance to ground of 25 ohms.
13. Tracer wire equipment connection points shall be clearly labeled indicating the opposite termination point of each tracer wire installed in the system.
14. Upon completion of the delineator and tracer wire system, the Contractor shall provide documentation that includes the locations of the tracer wire termination delineators and instructions on the methods and equipment required to locate the fiber optic conduit path using the tracer wire.
15. The completed tracer wire system shall be tested by the Contractor segment by segment by placing a tone on each segment to ensure the full length of the dielectric fiber optic conduit can be located. If during testing any segment is unable to establish or maintain a tone for locating the conduit, the Contractor shall replace that segment of tracer wire at no additional cost to the Department.

METHOD OF MEASUREMENT: Fiber Optic Delineator will be measured by the number of delineators furnished and installed.

Tracer wire will not be measured but shall be incidental to the conduit with dielectric fiber optic cable installed.

BASIS OF PAYMENT: The accepted quantity of Fiber Optic Delineators will be paid for at the Contract price each for the type specified, which payment will be full compensation for the delineator, anchor system, warning label, tracer wire termination equipment, backfill, and for all materials, labor, equipment and incidentals necessary to complete the work.

The installation of the tracer wire, including all connection equipment, tracer wire connectors, splicing, grounding and labeling will be considered incidental to the associated conduit item.

Payment will be made under:

Pay Item		Pay Unit
645.3065	Fiber Optic Delineator	Each

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC

Approaches. Approach signing shall include the following signs at a minimum. Field conditions may warrant the use of additional signs as determined by the Resident.

Road Work Next X* Miles
Road Work 500 Feet (Ahead)
End Road Work

Work Areas. At each work site, signs and channelizing devices shall be used as directed by the Resident.

Signs include:

Road Work xxxx[1].
One Lane Road Ahead
Flagger Sign

Other typical signs include:

Be Prepared to Stop
Low Shoulder
Bump
Pavement Ends

The above lists of Approach signs and Work Area signs are representative of the contract requirements. Other sign legends may be required.

Unless otherwise defined in Special Provision 105/107 or submitted and approved in the Traffic Control Plan, the following shall apply:

- The Contractor shall conduct their operations in such a manner that the roadway will not be restricted to one lane for more than 2,500 feet at each work area and no more than 4,000 feet for paving and milling work areas.
- Where more than one work area restricts traffic to one lane operation, these work areas shall be separated by at least 1 mile of two-way operation.

Temporary Centerline A temporary centerline shall be placed each day on all new pavement to be used by traffic. The temporary centerline, when specified of reflectorized traffic paint, shall conform to the standard marking patterns used for permanent markings. Failure to apply a temporary centerline daily will result in a Traffic Control Violation and suspension of paving operations until temporary markers are applied to all previously placed pavement.

[1] "Road Work Ahead" to be used in short duration operations and "Road Work xx feet" to be used in stationary operations as directed by the Resident.

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.01 DESCRIPTION: This work shall consist of the furnishing, installing, connecting, configuring, and testing intelligent transportation systems (ITS) devices, equipment, and associated materials. This specification includes materials, construction, integration, and warranty requirements for all ITS systems. Each specific ITS system or device will include its own specification that supplements the requirements of this specification.

654.02 GENERAL: All ITS equipment shall be new unless otherwise specified. Requests for substitution of any specified material shall be submitted in writing with all documentation (specifications, mill certifications, catalog cuts, shop drawings, etc.) in order to enable the Department to evaluate the equivalency of the substitution. Substitutes shall give equal or better service than the specified material or equipment.

654.025 MATERIALS: The Contractor shall provide a complete Technical Submittal as outlined below for all ITS systems, devices, and equipment. The requirements for the ITS Technical Submittal shall meet the following requirements and additional requirements as indicated by the specific ITS system, device, or equipment specifications:

1. This specification includes the universal requirements for all ITS Technical Submittals; additional requirements for specific ITS systems, devices, and equipment may be found in other specifications.
2. The Contractor shall not proceed with manufacture, fabrication, or construction until the Resident has approved the submittals in accordance with Section 105.7.
    a. The Contractor shall provide drawings, manufacturer's specifications, and applicable catalog cuts for all materials and components for this work, submitted in accordance with Section 105.7.
    b. The Technical Submittal shall list all proposed equipment to be provided and list project locations and ITS cabinet connection points where the equipment is to be installed and how the equipment will connect to the MaineDOT's ITS network.
    c. The Contractor shall provide cabinet diagrams for all equipment cabinets showing installed hardware and wiring connections.
    d. The Contractor shall provide electric load calculations required for all power supply equipment to be installed.
        i. Where solar powered systems are required, the Contractor shall provide solar power calculations to indicate the size, quantity, and capacity of the solar panels and batteries to meet the required autonomy standards.
        ii. Where uninterruptable power supply (UPS) is specified, the Contractor shall provide calculations to indicate that the proposed power requirements of the system can be accommodated by the UPS equipment in accordance with the specifications.

e. All specification documentation shall be clearly marked to identify the exact proposed model and all options to be supplied.
f. MaineDOT will give no guarantee as to the completeness of the Plan details and the Contractor shall be required to furnish, install, and test any other equipment and materials required to provide a complete and operational ITS device system.

3. Support Pole Submittals. The submittal for device support poles shall include the following for approval in accordance with Section 105.7.:
    a. Design computations (AASHTO LRFD) for support structures or poles, for the wind speeds defined in ITS system or device specifications. All calculations shall be signed and stamped by a Professional Engineer licensed in the State of Maine. The submittal for above grade components shall be in accordance with Section 626.034
    b. Complete sets of shop drawings for the pole signed and stamped by a Professional Engineer licensed in Maine.
    c. Manufacturer's specifications and applicable catalog cuts for all materials and components.
    d. If not provided with the Contract Documents, the Contractor shall submit elevation and plan views showing the device support locations, foundations, and the proposed slopes plotted on cross-sections showing no interference with utilities, drainage pipes or structures and showing support of excavation if needed for construction of the foundation.
    e. The submittal shall include the foundation system that is selected for each pole location in accordance with Section 626.034.
    f. When more than one Engineer is responsible for the design of separate components (i.e. pole, attachment information), the Contractor shall make one submittal containing all of the components unless otherwise allowed by MaineDOT.
4. Training Materials. When a training requirement is included in an ITS specification, the Contractor shall furnish and provide a separate Training submittal. This training submittal shall include the following:
    a. Samples of all training materials including student handouts, presentation materials, and training agendas.
    b. The proposed date, time, and location for the training program.
    c. Resumes for the proposed qualified instructors.
5. Ethernet Cable. Where Ethernet cable is specified in the Contract Document, it shall be interpreted to mean shielded, weatherproof Category 6 (Cat6) cable of the length required for the application. The maximum length for a single Cat6 cable shall be 325 feet. Cat6 cable shall not be spliced. If any Cat6 cable will be exposed to the sun, the cable shall be UV protected.

654.03 CONSTRUCTION:

1. ITS Device Documentation Requirements.

a. A minimum of 15 working days prior to configuration of the IP-addressable equipment, the Contractor shall formally request the assigned IP addresses from the MaineDOT Transportation Management Center (TMC).
b. All ITS Device documentation shall identify the specific manufacturer and model number as approved in the Technical Submittal.
c. IP addresses and login credentials will be assigned for each device by MaineDOT and returned to the Contractor.
d. The Contractor shall configure all devices with the correct IP addresses and login credentials assigned by MaineDOT.
e. The Contractor shall properly label all ports and outlets within device interfaces with the correct component connected to the port or outlet.

2. Software and Integration
   a. All ITS devices furnished and installed shall be fully compatible with the MaineDOT TMC's Advanced Transportation Management System (ATMS) known as New England Compass (Compass). This software was developed by the Southwest Research Institute (SwRI) and is used by the TMC's in Maine, New Hampshire, and Vermont.
   b. Where applicable, ITS devices and equipment shall also be fully compatible and integrated with specific equipment software (for example, Road and Weather software and Axis Camera Station software).
   c. If the Contractor proposes to supply equipment that is not fully compatible with current MaineDOT software, the Contractor shall be required to fully integrate the non-compatible equipment into Compass and other MaineDOT software so that the new equipment operates at the TMC in the same manner as existing equipment. All costs associated with software development, coordination with SwRI, and for all integration services shall be the responsibility of the Contractor.
   d. Additional software and integration requirements are included in each of the specific ITS systems or device specifications.
3. Final ITS System Acceptance
   a. Final ITS System Acceptance of installed devices shall be issued upon satisfactory completion of the Operational Acceptance Test period and any required Training. The ITS devices will be inspected and issued Final ITS System Acceptance upon approval and verification by the Resident and the MaineDOT TMC representative that the project requirements have been met 100 percent. The Contract Guarantee/Warranty period will commence after the Final ITS System Acceptance has been issued by MaineDOT.

654.04 TESTING:

1. ITS Device and System Testing
   a. In addition to the requirements of this specification, all installations of ITS devices and equipment, fiber optic cable, and wireless communication equipment will be subjected to rigorous testing before the work will be accepted by MaineDOT.

b. The Contractor shall follow the testing plans provided by MaineDOT. Successful completion of device testing, as specified in the applicable standard test plans, shall be considered a requirement of the Contract. The Contractor shall provide all equipment, materials and labor required to perform each test, including laptop computers, internet connections, software, and Maintenance of Traffic.
c. The Contractor shall coordinate with the MaineDOT TMC no less than 7 days prior to scheduling any equipment or systems testing.
d. MaineDOT reserves the right to examine and test or retest any or all materials furnished by the Contractor for the project to determine if they meet the requirements specified within the Contract Documents.
e. If MaineDOT decides that any material used in the construction of this project is defective or otherwise unsuitable, and the workmanship does not conform to the requirements of the is contract, the Contractor shall replace such defective parts and material at no cost to MaineDOT.
f. The Contractor shall conduct all tests in the presence of the Resident. Testing shall be scheduled only on weekdays, and subject to approval of MaineDOT.
g. System and Device Testing
    i. Stand-Alone Test - This test shall be performed on site at the ITS device or system. The purpose of the Stand-Alone tests is to exercise all stand-alone (non-network) functional operations of the equipment or device as installed and demonstrate compliance with the requirements for the equipment defined in the specifications. If a unit fails to pass the stand-alone test, the Contractor shall correct the problem or replace the part/device/system and retest until satisfactory results are achieved.
    ii. Subsystem Test – This test shall be performed for ITS devices and systems that are connected to a communication network other than a cellular modem. The purpose of the Subsystem test is to exercise the ITS device or system over the communication network locally, before making a final connection to the Compass software. If a unit fails to pass the subsystem test, the Contractor shall correct the problem, troubleshoot the communication system, or replace the part/device/system and retest until satisfactory results are achieved.
    iii. Central Control Test – This test shall be performed at the TMC in Augusta on Compass and on any subsidiary system software. The purpose of the Central Control Test is to exercise all remote functionality and control of the ITS device or system at a TMC workstation through Compass and other applicable software. The Contractor shall have a representative at the device location to provide on-site verification of device functionality as required by the Resident or the MaineDOT TMC. If a device or system fails to pass the central control test, the Contractor shall correct the problem or replace the part/device/equipment/system and retest until satisfactory results are achieved.
    iv. These tests are intended to be conducted sequentially per system or device.

v. Upon successful completion of the Central Control Test, the Contractor shall request in writing the initiation of the Operational Acceptance Test Period.

h. Completed test results shall be packaged and submitted to MaineDOT within 14 calendar days of test completion. No test phase shall begin until all prior test phases have been completed, and test results have been approved by MaineDOT.

i. As part of the system and device testing, the Contractor shall provide to MaineDOT a complete set of maintenance and user manuals along with all wiring and assembly schematics and diagrams.

j. The Contractor shall provide any test specific software required to complete the test.

2. Operational Acceptance Test Period

a. An Operational Acceptance Test Period will be required for all ITS components installed. This test period shall commence upon successful completion of field tests, communication tests, and central control tests, and will last for a minimum of 30 consecutive days unless a specific ITS system or device requires a longer test period. This test period will demonstrate that all the ITS devices, systems and components are properly installed, are free from problems, exhibit stable and reliable performance, communicate reliably with MaineDOT TMC and Compass and comply with the Contract Documents.

b. The Contractor shall coordinate with MaineDOT TMC to schedule any exercises and have a representative at the device to provide on-site verification of device functionality if necessary.

c. In the event of a failure, the test period shall be suspended until the Contractor resolves the failure (by repairing or replacing the failed part, equipment, or system). Upon successful repair or replacement, the test shall continue to the end of the 30 days, or for a minimum of ten days, whichever is longer. Upon any subsequent failure, or if the first failure is determined to be significant by the TMC, the Operational Acceptance Test Period shall be restarted for the full 30 days following repair or replacement.

654.05 GUARANTIES AND WARRANTIES:

1. The Contractor shall unconditionally guarantee all system and subsystem modules including all cabinets, equipment, hardware, and software installed to be free of defects.
2. It shall be the Contractor's responsibility to secure all guarantees that are customarily issued by the equipment manufacturers for the specific equipment included in the Contract. The form in which such guarantees are delivered to the Contractor shall include the provision that they are subject to transfer to MaineDOT and shall be accompanied by proper validation of such fact. Transfer of guarantees shall coincide with the Guarantee Period specified below.
3. The length of warranty will be one (1) year from the date of Final ITS System Acceptance by the Resident, as specified in Section 654.03.5a above, for each ITS system and device. Additionally, the Contractor shall guarantee availability of

compatible replacement equipment (to the field replaceable unit level) for a seven-year time period from the same date.

4. The warranty shall cover all parts, labor, transportation, shipping, tools, equipment mobilization, maintenance of traffic, and incidentals necessary to repair or replace any system component, device, equipment or sensor that fails to perform as required by the Contract Documents.
5. The warranty shall include technical support available via telephone and email 24 hours per day, 7 days per week, 365 days per year for the warranty period.
6. The terms of any equipment warranties stipulated by the equipment manufacturers shall be provided with product data included in the Technical Submittal, specified in Section 654.021. The terms of any equipment manufacturer's warranties will not relieve the Contractor from any of the guarantee requirements of this contract.
7. The Contractor shall be responsible for repairs during the guaranty/warranty period. Repair is defined as all activities that shall be performed for the system to remain in, or return to, operation as observed at the time of Final ITS System Acceptance. The work consists of the repair of defective devices that fail during the normal course of operation, and does not include repairs or replacements made necessary due to damage resulting from vandalism, traffic accidents, or acts of God.
8. The Contractor shall provide on-site warranty service of the equipment within 48-hours of notification by MaineDOT. If the Contractor is unable to affect a repair to the system within seven (7) calendar days of notification, temporary equipment meeting all the original equipment specifications may be requested by MaineDOT and shall be provided and installed at no cost to MaineDOT. The Contractor shall then either fix or replace the broken device or equipment at their discretion.
9. A log of all guarantee work performed by the Contractor during the Guarantee Period shall be maintained by the Contractor. The log shall include, as a minimum, the following information:
    a. Date and time defect reported
    b. Entity reporting the defect
    c. Description of the reported defect
    d. Technician responding to reported defect
    e. Arrival time at the site of the technician
    f. Technician performing defect repair or replacement
    g. Description of observed defect
    h. Corrective actions taken
    i. Model and serial number of any module repaired or replaced
    j. Date and time defect rectified
10. The Contractor shall maintain records, which show the itemized material, equipment, and labor cost incurred to provide response maintenance during the guarantee period. These records shall be provided to the TMC within 15 working days of the warranty work. These records will not be used as a Basis of Payment to the Contractor. The Contractor shall assure that these cost records are as complete and accurate as practicable. MaineDOT may perform an audit to verify the accuracy of the cost records.
11. When a guarantee is available on repaired or replacement components, a written and signed guarantee shall accompany the manufacturer's billing invoice. The Resident,

TMC representative, or inspecting agent will sign and retain the original and provide a copy to the maintaining agency and a copy to the manufacturer.

12. If the same component requires repair more than twice during the warranty period, the Contractor shall replace the component rather than provide a third repair at no additional cost to the Department.

654.06 METHOD OF MEASUREMENT:

The development and submission of ITS Technical Submittals, including the independent training materials submission, will not be measured, but shall be considered incidental to the ITS system, device or equipment installed.

Guarantees/Warranties will not be measured, but shall be considered incidental to the ITS system, device or equipment installed.

Testing and integration of fiber optic cable, ITS systems, or devices, will not be measured, but shall be considered incidental to the equipment being installed, tested, and integrated. No separate payment shall be made for the monitoring, testing, test equipment, and documentation of test results.

Training for ITS systems, devices, or equipment will not be measured, but shall be considered incidental to the ITS system, device, or equipment installed. No separate payment shall be made for the preparation of sample or classroom training documents, classroom lodging, field materials or tools for hands-on demonstrations, or presentation of training materials.

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS
(Closed Circuit Television (CCTV) Pole and System Equipment)

654.211 Closed Circuit Television (CCTV) System

This work shall consist of furnishing, installing, integrating, and testing Closed Circuit Television (CCTV) systems and equipment. The work shall include furnishing and installing new galvanized steel poles with steel reinforced concrete foundations. The work shall include furnishing and installing all camera equipment and accessories as defined in this specification onto new steel poles with a lowering device mount. The work shall include the testing of all equipment function, all software function, and camera capabilities.

This specification also includes the work necessary to integrate the camera image and video data obtained by the CCTV camera into the Maine Department of Transportation (MaineDOT) Advanced Transportation Management System (ATMS) called New England Compass (Compass). Compass was developed by the Southwest Research Institute (SwRI) and is used by Maine, New Hampshire and Vermont for their respective Transportation Management Centers. The CCTV shall be integrated into MaineDOT's Axis Camera Station software.

This specification also requires that the Contractor shall provide a System Integrator to integrate the CCTV image and video data into Compass. The System Integrator shall be responsible for coordination with SwRI to ensure that the new CCTV camera is fully integrated and functions in Compass.

654.021 General: If any of the following hardware-specific requirements listed in the following sections cannot be met by a willing Bidder, but the Contractor believes that strict conformance to the given requirement is unnecessary or may be accomplished differently, the Contractor shall provide a list of the requirements that cannot be strictly met along with a justification for how the Contractor's proposed CCTV System Equipment may be considered functionally equivalent in accordance with Special Provision 103.

If the Contractor proposes to provide a new CCTV software, the Contractor shall provide a licensed copy of the software to the MaineDOT Transportation Management Center (TMC) for review. MaineDOT reserves the sole authority to determine if the proposed software may be considered functionally equivalent in accordance with Special Provision 103.

The Contractor shall provide the qualifications of the System Integrator to the Department as a condition of Contract Award as described in Special Provision 103. All work associated with system integration shall be under the direct supervision of the System Integrator. The System Integrator shall demonstrate working knowledge of Compass and have experience working with the CCTV image and video data to be supplied under this project. The System Integrator should also have working knowledge of the Axis Camera Station software.

CCTV System data integration shall be accomplished with minimal interruption to the existing MaineDOT TMC operations or the existing Axis Camera Station software in use at the TMC. Any required downtime of Compass shall be approved by the Resident at least seven (7) days in advance.

654.026 CCTV System Equipment – General

1. The CCTV camera shall be compatible with the existing Axis Camera Station software at the MaineDOT TMC. Alternatively, the Contractor may provide a different camera control software; however, if the Contractor elects to provide an alternative software, the Contractor shall also provide software licenses for all existing MaineDOT CCTV cameras, re-integrate all existing CCTV cameras into Compass, and provide 24/7 technical software support for a period of two years following project approval.
2. The CCTV camera shall be Underwriter's Laboratory (UL) approved. UL certification shall be provided with the catalog cuts in the Technical Submittal.
3. The CCTV camera shall weigh no more than 10 pounds.
4. The CCTV camera shall be digital, IP addressable and Ethernet ready.
5. The CCTV interface shall be an RJ45 type connector for 10BASE-T/100BASE-TX, and shall include an IP66-rated RJ45 connector kit.
6. CCTV System Image Requirements:
    a. The CCTV shall have the following image setting functionalities: Wide dynamic range (WDR), manual shutter time, compression, color, brightness, sharpness, white balance, exposure control, exposure zones, backlight compensation, fine tuning of behavior at low light, rotation, text and image overlay, 32 individual 3D privacy masks, image freeze on PTZ, electronic image stabilization and automatic defog.
    b. The CCTV shall provide a camera imaging system that automatically shifts from daytime mode to nighttime mode, and shifts from color mode to a black-and-white mode under very low light conditions, in order to render a more detailed video image.
    c. The CCTV shall provide automatic and manual control of camera imaging characteristics (such as exposure and contrast).
7. The CCTV shall return operational status and report system faults to Compass.
8. The CCTV shall receive and process camera positioning and camera configuration commands received from Compass.
9. The CCTV shall have the capability to be viewed, controlled, and tested locally at the camera site utilizing a laptop computer with OEM software. This shall include the capability to locally retrieve operational status and fault data for the CCTV.
10. The CCTV camera dome shall be constructed of clear polycarbonate with a sun shield.
11. The lower exterior dome shall be made of seamless polycarbonate, optically clear with no distortion, optical discontinuities, or anomalies of any type in any portion of the dome up to 20-degrees above horizontal.
12. The CCTV camera dome drive system shall consist of an integral camera pan-tilt assembly with a variable high speed drive unit with continuous 360-degree rotation, CCD camera, optical and digital zoom, auto focusing, motorized zoom lens and integral camera control receiver.

13. The CCTV shall have user-defined "pre-sets" for position, zoom, exposure and focus, to be defined by the TMC operators.
14. The CCTV shall have a minimum Pan/Tilt/Zoom functionality of: 100 preset positions, 360° endless pan at a speed of 0.05 - 450°/sec; Tilt - 220° at a speed of 0.05 - 450°/sec.
15. TMC control of CCTV PTZ features shall have a latency of no greater than one second.
16. The CCTV shall have an automatic variable pan-tilt speed adjustment operating as a function of degree of zoom.
17. The CCTV shall have a minimum 30x optical zoom and 12x digital zoom, total 360x zoom.
18. The CCTV shall have alarm triggers from multiple sources including intelligent video, PTZ position.
19. The CCTV shall have a minimum 1/3-inch progressive scan CCD image sensor.
20. The CCTV shall have a minimum illumination of: Color: 0.2 lux at 30 IRE; B/W: 0.04 lux at 30 IRE.
21. The CCTV shall have minimum resolution range of: HDTV 320x180 up to 1920x1080, 1080p.
22. The CCTV shall provide H.264 (MPEG-4 Part 10/AVC) and Motion JPEG video compression formats.
23. The CCTV shall have a minimum frame rate of: H.264 25/30 frames per second (fps) (50/60 Hz) in all resolutions, M-JPEG: up to 25/30 fps (50/60 Hz) in all resolutions.
24. The CCTV shall be capable of multi-streaming in H.264 and Motion JPEG formats: Multiple individually configured streams in maximum resolution at 30/25 (60 / 50 Hz) fps. The frame rate and bandwidth shall be controllable.
25. The CCTV shall have the following security features: password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, digest authentication, user access log.
26. The CCTV shall support the following protocols: IPv4/v6, HTTP, HTTPSa, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, and NTCIP.
27. The CCTV shall conform to the ONVIF Profile S standard and have an open Application Programming Interface (API) for software integration.
28. The CCTV camera shall be able to process, at a minimum, the following alarm events:
    a. File upload: FTP, HTTP, and network share.
    b. Email notification: email, HTTP and TCP.
    c. Data transmitted from CCTV camera: PTZ preset, guard tour, video recording to edge storage, auto-tracking, day/night mode, and pre- and post-alarm video buffering.
29. The CCTV installation shall include two (2) in-line transient voltage surge suppression (TVSS) to protect against transients and surges carried by the associated Ethernet cable. One unit shall be placed within 5 feet of the camera enclosure and the second internal to the ITS cabinet before the associated Ethernet switch port.
30. The CCTV shall be powered by an industrial grade Power Over Ethernet Injector (POEI).

a. The POEI shall provide operating power and Ethernet data to the CCTV. The POEI power consumption shall not exceed 60 watts.
b. The POEI shall include integral TVSS to protect against transients and surges on the incoming power and data (Ethernet) connections to the POEI, as well as to protect against transients and surges on the outgoing data (Ethernet) connection to the camera. The TVSS shall be a product approved by the CCTV manufacturer for use with the camera.

31. The CCTV shall be housed in an environmentally hardened aluminum enclosure suitable for continuous outdoor use and shall feature an internal temperature regulation system. The CCTV shall be IP66-, NEMA 4X- and IK09-rated and shall have an operating temperature range of -40°F to +122°F, minimum.
32. The CCTV shall be mechanically and functionally compatible with the camera pole mounted lowering device.

654.027 CCTV Support Pole and Lowering Device

1. The CCTV support pole and all associated members shall be designed by a licensed Professional Engineer and designed and fabricated in accordance with the current edition of *AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* and MaineDOT *Standard Specifications Section 504*, except as noted below:

Basic Wind Speed:	1700-year Mean Recurrence Interval (MRI) basic wind speed of 130 mph (209 km/hr)
Fatigue Importance Category:	Cantilevered Category II (poles with distance to roadway > height of pole)
Fatigue Importance Category:	Cantilevered Category I (poles with distance to roadway ≤ height of pole)

2. The pole shaft shall be one or two-piece construction and shall conform to ASTM A595 Grade A with a minimum yield strength of 55 ksi or ASTM A572 with a minimum yield strength of 55 ksi.
3. The pole shaft and all associated ancillary members shall be steel, galvanized in accordance with the current *AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* and MaineDOT *Standard Specifications Section 720*.
4. The CCTV support pole shall be designed to support the CCTV camera, dual lowering devices (even if the proposed structure only requires one lowering device), and ancillary equipment in the quantities and locations indicated on the CCTV Detail plan sheets. If only one lowering device is shown on the CCTV Detail plan, the design calculations shall account for a second lowering device located at 90 degrees from the proposed device. Close consideration shall be given to the effective projected area of the complete lowering system and equipment to be mounted on the pole along with the weight of attached hardware when designing the pole to meet the specified deflection performance criteria, including consideration for all possible loading combinations; and the factored design forces and resistances for all components which comprise the proposed structure. The top of the pole total deflection shall not exceed the following:
    a. 1 percent of pole height due to 90 MPH (non-gust) winds; and
    b. 1 inch due to 30 MPH (non-gust) winds.

5. The calculations shall include a pole, base plate, and anchor rod analysis (embedded length shall be confirmed by the Engineer designing the foundation). The pole calculations shall be analyzed at the pole base and at 5-foot pole intervals along the full height of the pole. At each of these locations, the following information shall be provided by the Contractor:
    a. The pole's diameter, thickness, section modulus, moment of inertia, and cross sectional area.
    b. The centroid, weight, projected area, drag coefficient, velocity pressure, and wind force of each trapezoidal pole segment.
    c. The factored axial force, shear force, primary moment, total moment, axial resistance, bending resistance, and capacity demand ratio (CDR) at each elevation.
    d. The pole's angular and linear deflection at each location.
6. Hand Holes: The hand hole openings shall be reinforced with a minimum 2-inch wide hot rolled steel rim. The nominal outside dimension is 6 inches x 27 inches. The hand hole shall have a galvanized steel cover secured with a clip on lock and tamper proof bolts. The hand hole shall have a tapped hole for mounting a portable lowering tool. The hand holes shall be fully compatible with the portable lowering tool.
7. Weatherhead: A two-inch galvanized steel weatherhead shall be factory installed in the camera pole for wire access near the top of the pole as shown on the support pole plan details. No field drilling will be permitted.
8. Pole Top Tenon: The pole shall have a plate-mounted tenon that allows the field modification of the arms/camera orientation up to 360 degrees. The Engineer can then make slight orientation modifications to the camera mounts to allow optimum viewing in case of future road development; change in terrain or a change in the viewing needs priority. The tenon shall have mounting holes and slot for the mounting of the camera-lowering systems. The tenon shall be of dimensions necessary to facilitate dual camera lowering device component installations. Each slot shall be parallel to the pole centerline for mounting the lowering devices.
9. Cable Supports / Wire Eyes and Park Stands: Two wire eyes and three park stands shall be located within the pole. One wire eye shall be positioned 2 inches below the hand hole and the other shall be positioned one inch directly below the top of tenon. Two park stands shall be positioned a maximum of 2.0 inches below the top of the hand hole and located at 90 and 270 degrees from the hand hole. A third park stand shall be located in the center of the upper inside edge of the hand hole as shown on the drawings. These park stands shall be a minimum of ¼ inch O.D. and a max 3/8-inch O.D.
10. Base Plate: Base plates shall conform to ASTM A36 or A572 Grade 42.
11. Lightning Dissipater: The CCTV support pole shall be supplied with a lightning dissipater, consisting of a series of at least four spot dissipaters in a candelabra arrangement with a single mounting assembly. The lightning dissipater system shall include surge suppressor devices of the type recommended by the lightning dissipater manufacturer, and shall properly interface with the pole mounted dissipater, and the size and type of cables used for communication and control of any installed equipment.

12. Camera Junction Boxes: The camera junction boxes shall be of clamshell design with one hinge side and one latch side to facilitate easy opening. The general shape of the box shall be cylindrical to minimize the EPA. The Camera Junction Boxes shall have stabilizing weights on the outside of the box to increase room on the interior. The boxes shall be capable of having up to 40 pounds of stabilizing weights. The bottom of the Camera Junction Boxes shall be drilled and tapped to accept industry standard dome housings and be able to be modified to accept a wide variety of other camera mountings. The junction boxes shall be gasketed to prevent water intrusion. The bottom of the box shall incorporate a screened and vented hole to allow airflow and reduce internal condensation per the manufacturer's specifications.
13. Camera Lowering Systems: The camera lowering systems shall be designed to support and lower an IP driven CCTV camera, lens, housing, pan-tilt-zoom (PTZ) mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The lowering systems shall consist, at a minimum, of a pole, suspension contact unit, divided support arm, and a pole adapter for attachment to a pole top tenon, pole top junction box, and camera connection box. The divided support arm and receiver brackets shall be designed to self-align the contact unit with the pole center line during installation and ensure the contact unit cannot twist under high wind conditions. The support arms shall be designed such that the arm will be locked in place to withstand camera support arm rotation under high wind conditions by either geometry, through-bolt construction, or other means.
14. The camera-lowering devices shall withstand wind forces of 100 MPH with a 30 percent gust factor using a 1.65 safety factor.
15. Suspension Contact Unit: The suspension contact unit shall have a load capacity of 600 pounds with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a minimum of 2 latches. This latching mechanism shall securely hold the device and its mounted equipment. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.
16. The prefabricated components of the lift unit support systems shall be designed to preclude the lifting cables from contacting the power or video cabling. The lowering device manufacturer shall provide conduit mount adapters for housing and isolating the lowering cables inside the pole.
17. The female and male socket contact halves of the connector block shall be made of a UL94, V-0 rated thermosetting synthetic rubber or approved equivalent. The female barrel contacts and the male pin contacts shall be encased into the connector block body.
18. All electrical and communication connections between the fixed and lowerable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent moisture infiltration and degradation of the electrical contacts.
19. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits and 1 volt peak-to-peak video signals as well as the power requirements for operation of dome environmental controls.
20. The interface and locking components shall be made of stainless steel and/or aluminum. All external components of the lowering device shall be made of corrosion

resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment. The corrosion resistance materials shall be as per manufacturer's specifications and procedures.

21. The camera assembly manufacturer shall provide the power and signal connectors for attachment to the bare leads in the pole top and camera junction boxes.
22. The camera assembly manufacturer shall provide a mounting flange sufficient for mounting their respective camera assembly to the bottom of the camera connection box.
23. Portable Lowering Tool: The manufacturer shall provide a variable speed, heavy-duty reversible drill motor and a lowering tool. The lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment. This tool shall be compatible with accessing the support cable through the hand hole of the pole. The tool shall support itself and the load assuring lowering operations and shall provide a means to prevent freewheeling when loaded. The lowering tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise and lower a capacity load.
24. The lowering tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The lowering tool shall be equipped with a positive breaking mechanism to secure the cable reel during raising and lowering operations and prevent freewheeling.

654.028 CCTV Foundation. The foundation for the CCTV pole shall be constructed in accordance with Section 626 for drilled shaft foundations.

654.029 CCTV Cables

1. All equipment shall be supplied with the Manufacturer's recommended cables.
2. All free-hanging Ethernet cable shall be plenum type.

654.031 CCTV System Construction Requirements

The Contractor shall install the CCTV system equipment in accordance with the Plans. The Contractor shall be responsible for all other work to provide a fully functional, operational, and integrated CCTV System at the locations identified in the Plans.

The Contractor shall install, configure, integrate, and test the CCTV image and video data into Compass and the MaineDOT Axis Camera Station software. The Contractor shall provide the first year software license for the new camera.

1. Power Requirements
    a. Each CCTV location shall be supplied with adequate power to meet the site and sensor design loads. The power may be AC (public utility power as provided by others) or DC (solar power system) as required by the Plans.
    b. Where solar power is provided, the Contractor shall furnish, install, configure and test the solar power system equipment to provide the required power to the CCTV equipment.

2. Grounding, Bonding and Transient Voltage Surge Suppression System Requirements
    a. All CCTV sites shall be grounded to a minimum of 25 ohms to ground. If other national, state, or local grounding requirements are more stringent than those of the manufacturer, the applicable national, state, or local code shall apply.
    b. The Contractor shall install solid copper or copper clad ground rod (minimum of four each at ¾-inch x 10-foot) along with #4 AWG ground wire and fittings at the base of the CCTV equipment pole. The Contractor shall install additional ground rods required to meet the minimum grounding requirement.
    c. The ground wire shall be exothermically welded to each ground rod installed with all ground rods attached to every other ground rod via the ground wire.
    d. The CCTV grounding system shall be bonded to the controller enclosure bus-bar and the steel support structure in accordance with National Electric Code (NEC) requirements.
    e. The Contractor shall furnish and install Transient Voltage Surge Suppressor (TVSS) devices for all power and communications conductors installed.
        i. The Contractor shall provide and install a TVSS between the AC power mains and all installed equipment.
        ii. The CCTV shall include integral TVSS to protect against transients and surges on all incoming power and data connections to the CCTV. The TVSS shall be a product approved by the CCTV manufacturer for use with the CCTV.
    f. The CCTV support pole shall be supplied with an air terminal that is bonded by an insulated wire to the earth terminal-wire attachment at the base of the pole.
    g. The CCTV support pole shall be supplied with a lightning dissipater that is attached to a #6 AWG stranded bare copper wire bonded to the ground terminal.
    h. The lightning dissipater system shall include surge suppressor devices of the type recommended by the lightning dissipater manufacturer, and shall properly interface with the pole mounted dissipater, and the size and type of cables installed in the CCTV support pole.
        i. The lightning dissipater shall be attached to the CCTV support pole using manufacturer-recommended clamps that are attached to the pole. These clamps shall rigidly hold the lightning dissipater to the CCTV support pole in winds up to 100 MPH.
        ii. The lightning dissipater shall be offset from the CCTV support pole and provide protection for the site above any installed equipment without interfering with the functionality of any equipment or sensors.
    i. The CCTV lowering systems shall also be grounded to the same system as the CCTV support pole. The CCTV support pole shall also include provisions to allow for grounding connections of CCTV cameras through a lug located in the camera junction box. All installed CCTV cameras, lowering systems, and any other installed equipment shall be grounded.
3. Communications Requirements
    a. The CCTV system shall transmit image and video data to Compass and MaineDOT's Axis Camera Station software currently in operation.
    b. The Contractor shall provide all necessary equipment, cables, hardware, and ancillary equipment to capture the CCTV image and video data and transmit the

data to Compass and to the Axis Camera Station software at the MaineDOT TMC.

c. The communication system shall allow for configuration control and trouble-shooting of the CCTV equipment through both a local onsite connection and through a remote connection to the controller.

4. Software and Integration Requirements
   a. If the Contractor proposes to supply equipment that is not fully compatible with Compass or the current Axis Camera Station software, the Contractor shall be required to fully integrate the non-compatible equipment into Compass and the Axis Camera Station software so that the new equipment operates in the programs in the same manner as the existing CCTV cameras. All costs associated with software development, coordination with the SwRI, and for all integration services shall be the responsibility of the Contractor. After the first year license, Axis Camera Station Software licensing fees will be paid by MaineDOT.
   b. The Contractor shall ensure that Compass and the Axis Camera Station software reporting functions include and incorporate the new CCTV sites installed on this project.
5. CCTV Support Pole with Lowering Devices.
   a. The Contractor shall supply and install internal conduits inside the pole to isolate and separate the lowering cables from all other equipment cables. These conduits shall interface with the lowering device through Manufacturer supplied mounting adapters. Only the lowering cable shall be permitted to move within the pole or lowering device during lowering or raising operations.
   b. The lowering system shall be provided and installed with all components as per manufacturer's specifications and procedures. The Contractor shall arrange for the Manufacturer's factory representative to be present on site assist with the assembly, installation and testing of the lowering system.
   c. Camera lowering devices shall be installed to provide unobstructed camera views along the mainline roadway.
   d. Weights and/or counterweights shall be provided by the Manufacturer as necessary to assure that the alignment of pins and connectors are proper for the camera support to be raised into position without binding. The lowering unit shall have sufficient weight to disengage the camera and its control components for lowering.
   e. The Contractor shall provide a sealant between the lowering device and the camera assembly to assure water tightness of the camera assembly.

6. ITS Cables
   a. All equipment shall be installed using the Manufacturer's recommended cables.
   b. All cables shall be installed in a continuous run. Splicing will not be allowed.

654.041 System Testing

1. All CCTV cameras and equipment installed under this project shall be tested prior to final acceptance. See Special Provision 654 for additional information.

2. Subsystem testing will not be required.

654.061 Method of Measurement. Closed Circuit Television (CCTV) Systems will be measured for payment by the lump sum complete in place per site, satisfactorily installed, tested, operational, and accepted.

654.07 Basis of Payment. Closed Circuit Television (CCTV) Systems will be paid for at the contract lump sum price for each location. Such price will be full compensation for furnishing and installing all materials, including but not limited to the CCTV camera; CCTV controller; support poles and foundations; lowering device system; mounting brackets and hardware; flexible and internal conduits; Ethernet cables and associated communication equipment; power over Ethernet injectors (POEI); utility connections and wiring; grounding and TVSS equipment; integration and software modifications; software licensing; system testing; training; warranties and guaranties; and all appurtenances, labor, tools, materials, transportation and incidentals required for a complete and functional installation. Payment shall include all design calculations, submittals, and shop drawings for the support pole.

Payment will be made under:

Pay Item		Pay Unit
654.211	Closed Circuit Television (CCTV) System	Lump Sum

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.31 ITS Equipment Cabinet This work shall consist of furnishing, installing, wiring, and testing ITS Equipment Cabinets with all other cabinet hardware and ancillary equipment necessary to provide a complete working system as shown on the plans or as ordered.

654.51 Electrical Service Connection This work shall consist of furnishing, installing, wiring, and testing metered and unmetered disconnect pedestals with service wires and transformers (as required) with all ancillary equipment necessary to provide a complete electrical service connection to a public utility power supply as shown on the plans or as ordered.

654.026 Equipment Cabinet Requirements: The ITS Equipment Cabinet shall meet the following requirements:

1. Ground Mounted ITS Equipment Cabinets shall be 66”H x 24”W x 30”D. The cabinets shall have two locking doors located on opposite sides of the cabinet. All equipment housed in the cabinet shall be rack mountable.
2. Each cabinet shall contain a full-height standard EIA 19-inch rack. The rack shall be secured within the cabinet by mounts at the top and bottom.
3. Concrete work pad for cabinets shall meet the requirements of Section 626 – Foundations, Conduit, and Junction Boxes for Highway Lighting, Traffic Signals, and Highway Lighting.
4. The cabinets shall protect all equipment against sustained winds of 90 miles per hour (MPH), with 120 MPH wind gusts, blowing sand and dust, roadside pollutants from vehicle exhausts, blowing rain and snow, and heavy ice accumulations.
5. The cabinets shall be weatherproof with the top of the enclosure crowned or slanted to prevent standing water. The field cabinet shall also provide protection against vandalism and theft of equipment. Each cabinet door shall be supplied and installed with Corbin 1548-1 locks for access by #2 keys.
6. The cabinets and doors shall be constructed from sheet aluminum, which has a minimum thickness of 0.125 inches. All welds shall be neatly formatted and free of cracks, blowholes and other irregularities.
7. The cabinets shall be supplied with a captive door restraint bar. The bar shall allow the door to be kept open at a minimum of two different angles, with one at 90 degrees and the other in the fully open position. The door restraint bar shall be supplied and installed such that the door is held in place during a 40 MPH wind without the restraint bar being bent. The door restraint bar shall be provided to prevent door movement when open in windy conditions.

8. Door hinges shall be continuous and bolted to the cabinet and door utilizing steel carriage bolts and nylock nuts. The hinges shall be made of a minimum 0.083-inch thick aluminum and shall have a minimum 0.250-inch diameter stainless steel hinge pin. The hinge pin shall be capped at the top and bottom by a weld to prevent removal.
9. The top and bottom of the latching pushrods shall contain nylon rollers to promote secure door closure.
10. The door handles shall be stainless steel. The latching handles shall have provisions for padlocking in the closed position.
11. The cabinets shall contain a power panel, sized for the required current and the required number of circuit breakers. The panel shall also contain a single-phase filtering surge protector, designed for use within traffic equipment cabinets, to absorb power line noise and switching transients. The cabinet shall also be supplied with electrical neutral and ground terminal busses. All electrical equipment will be dead front, no exposed electrical terminals, and shall be finger safe.
    A generator transfer switch shall be installed at each cabinet. The generator transfer switch shall be an external manual 30-amp, 125-volt switch with a confirmation pilot light. The confirmation pilot light shall be illuminated when hardwire power is live in the cabinet.
12. The cabinets shall be equipped with a slide out metal drawer, constructed and installed such that it is capable of holding a 15-pound laptop computer, and mounted at a suitable height for a technician to use as a computer workstation.
13. The cabinets shall be supplied with a 120 VAC, 200 watt radiant heater. The radiant heater shall be a self-contained device designed to provide heat for an outdoor metal enclosure. The heater shall have an on/off switch, along with an adjustable thermostat with a minimum turn on range of 10°F to 60°F.
14. The air filters shall have an average rated efficiency of 30% and an arrestance of 90% when tested in accordance with ASHRAE 52.1-1992 Test Standard. The filter shall be listed and rated Class 2 by the Underwriters Laboratories. Filters shall have a metal structure; paper or paper-based filters shall be prohibited.
15. All intake and exhaust vents shall meet NEMA 3R requirements with and without powering the air venting arrangements.
16. Ground mounted cabinets shall be mounted and secured on concrete foundations as shown in the plans.
    A 3’0” x 3’0” x 4” concrete work pad shall be installed in front of each cabinet door. The pad shall be placed on a minimum of 4-inches of compacted granular material, and the pad shall be set with at least 1 percent grade sloping away from the cabinet. Where the work pad is installed on a slope, the depth of the pad shall be increased such that there is at least two inches of the concrete pad below grade.
17. All conduits terminating in the cabinet shall be sealed with duct sealant. Use of tape to permanently seal conduits shall be prohibited.

    17.1 Conduits less than 1 inch diameter shall be sealed with a silicone sealant.

17.2 Conduits with diameters greater than one inch shall be filled with stainless steel wool in addition to being sealed with duct sealant.

18. Prior to placing the ITS cabinet on the concrete foundation, silicone sealant shall be applied to the area of contact. A two-inch gap shall be left without sealant on the side of the cabinet.
19. Where indicated, spare sweeps shall be provided in the cabinet foundations for future use. If no spare sweeps are identified in the Plans, the Contractor shall supply one 2-inch PVC conduit sweep as a spare.
20. All ground-mounted cabinets shall include grounding as described in Grounding, Bonding and Surge Suppression below.
21. Ground mounted cabinets shall be installed with doors opening parallel to adjacent traffic.
22. All cabinet electrical wiring and communication cables shall be of diameters and colors as required by the device Manufacturers.

    22.1 Cabinet wiring shall be secured with appropriate cable ties to maintain a neat appearance.

23. Each cabinet shall contain a power panel containing a primary circuit breaker, which will accept the incoming 120 VAC, single-phase power. This primary circuit breaker shall serve as the electrical disconnect for the cabinet and shall shut off all cabinet power when in the “off” position.
24. The primary circuit breaker shall be a single pole, 30-amp breaker. Two additional single pole, 20-amp circuit breakers shall be supplied, installed and be fed from the primary circuit breaker.

    24.1 One of the 20-amp circuit breakers shall feed the four 15-amp electrical outlets to be installed in the cabinet.
    24.2 The other 20-amp circuit breaker shall feed a power distribution buss, providing hard wired electrical feed for the lamps, the cabinet heater, the electric fan, and all other integrated electrical equipment.

25. The power panel shall also contain a single-phase filtering surge protector.
26. The cabinets requiring a generator transfer switch, as defined above, shall contain all necessary AC power equipment required for connections to utility power and generator power. This shall include disconnect switches, circuit breakers, surge suppressors, power distribution equipment, and other equipment required to fully power the cabinet and ITS equipment.

27. The cabinets requiring a generator transfer switch, as defined above shall include power inputs for connections to external power sources, including both from the local utility company AC lines service, and from an external generator.

    27.1 Access to the external manual transfer switch shall be protected by a keyed lock. The generator transfer switch access key shall be different from the cabinet's main door key.

28. The field cabinets shall be provided with a minimum of four utility electric power outlets to support electrical equipment. The utility power outlets shall be installed within the field cabinet and not on the cabinet doors.

29. The current rating of all utility outlets shall be 15 amperes, with at least one being a GFCI outlet.

30. The field cabinets shall include a thermostatically controlled electric cooling fan, capable of maintaining temperatures inside the cabinet to levels recommended by the equipment Manufacturers for outside installations, or as specified in these Special Provisions.

31. Thermostats for controlling electric cooling fans shall have the capability of being field adjusted from 50°F to 120°F.

32. All exposed, high voltage electrical terminals shall be insulated with non-conducting material such as rubber boots or silicone/rubber caulking.

33. The cabinets shall be electrically bonded to all associated metallic ITS Device support structure grounding systems, as described below or shown on the Plans.

34. All air venting arrangements shall contain air filters. All fans shall be located above the air filters at the top of the cabinets. All exhaust vents shall be furnished with a screen to prevent insects from entering the field cabinet.

35. The cabinets shall be supplied and installed with two internal lights located in the top of each cabinet inside each door. These lights shall automatically turn on when the cabinet doors are open and shut off when the doors are closed. The lights shall be hardwire-connected to the cabinet's electrical power distribution buss. The lights shall be LED.

36. Two keys shall be supplied for the generator transfer switch access. Four sets of keys shall be supplied for each of the two cabinet locks.

37. The Contractor shall furnish, in a watertight container, a control cabinet-wiring diagram. Three sets of identical wiring diagrams shall be furnished for each cabinet.

38. If tracer wire equipment connection points are installed inside ITS equipment cabinets, the tracer wire shall enter the cabinet through a conduit or conduit riser specifically installed for that purpose.

39. All equipment shall be installed using the Manufacturer's recommended cables.

40. The Contractor shall furnish, install, connect, and test all Category 6 (Cat6) cables, of the types required for the application, at locations shown in the Plans or as required to construct a complete, functional system.

41. The Cat6 cables shall not exceed 325 feet in length unless the Contractor is granted written permission from the Engineer.

    41.1 All cables shall be installed in a continuous run. Splicing will not be allowed.

654.027 Electrical Service Equipment Material Requirements:

1. Electrical Service Equipment shall consist of all materials required to establish public utility power to an ITS equipment cabinet.

2. There shall be a metered disconnect pedestal located within 25 feet of the power source pole representing the demarcation point between the utility service provider and MaineDOT.

3. Meter and disconnect pedestals, also known as metered service pedestals, shall be UL listed "Suitable for Service Equipment" and shall be acceptable to the local utility companies for use as a service connection.

4. Meter pedestals shall consist of a galvanized steel post containing a main circuit breaker for service disconnect, branch circuit breakers as required by the Plans, and an integral meter socket.

5. Meter pedestals shall contain a 100 amp main circuit breaker and two 50 amp branch circuit breakers, or as otherwise shown on the Plans.

6. Disconnect pedestals shall consist of a galvanized steel post containing a single branch circuit breaker.

7. Disconnect pedestals shall not be metered. If a meter socket is provided, the disconnect pedestal shall contain a meter bypass.

8. Disconnect pedestals shall contain a single 40 amp circuit breaker, or as otherwise shown on the Plans.

9. The metered service installed shall provide power with a reserve capacity of 50 percent over the requirements of the connected ITS equipment cabinet(s) and all installed equipment, including the connected ITS loads.

10. The Contractor shall adhere to all applicable NEC, IEEE 1100-1992, UL 1459, and UL 1950 standards and practices.

11. The meter and disconnect equipment shall be capable of clearing a fault of any magnitude up to the total available fault current of the system without damage to the equipment. The meter and disconnect equipment shall include weatherproof arc flash labeling meeting the requirements of the National Fire Protection Association (NFPA) 70E Standard.

12. Transformers. Transformers shall be 5.0 KVA Step-Up or Step-Down, and shall meet the following requirements:

    a. Incoming Power.
        i. The Step-Up Transformer shall receive incoming power at 120/240 Volts AC, single phase. The primary (input) side of the Step-Up Transformer shall be capable of accepting 120 Volts AC single phase power (two wire), 240 Volts AC single phase power (two wire), and 120/240 Volts AC single phase power (three wire).
        ii. The Step-Down Transformer shall receive incoming power at 240/480 Volts AC, single phase. The primary (input) side of the Step-Down Transformer shall be capable of accepting 240 Volts AC single phase power (two wire), 480 Volts AC single phase power (two wire), and 240/480 Volts AC single phase power (three wire).
    b. Output Power.
        i. The Step-Up Transformer shall provide output power at 480 Volts AC, single phase. The secondary (output) side of the Step-Up Transformer shall be capable of providing 480 Volts AC single phase power (two wire), 240/480 Volts AC single phase power (three wire), and 240 Volts AC single phase power (two wire).
        ii. The Step-Down Transformer shall provide output power at 120/240 Volts AC, single phase. The secondary (output) side of the Step-Down Transformer shall be capable of providing 120 Volts AC single phase power (two wire), 120/240 Volts AC single phase power (three wire), and 240 Volts AC single phase power (two wire).
    c. Unless specifically allowed by the transformer Manufacturer, a step-up transformer shall not be a step-down transformer wired in reverse. Likewise, a step-down transformer shall not be a step-up transformer wired in reverse.

    d. The Step-Up and Step-Down Transformers shall be rated by the Manufacturer for supplying loads of 5.0 KVA, 60 Hz AC, when installed in an unprotected outdoor environment.

e. All equipment used on Step-Up and Step-Down Transformers shall be individually UL listed, CSA certified and suitable for outdoor use.

f. Step-Up and Step-Down Transformers shall be an enclosed dry type unit.

g. Step-Up and Step-Down Transformers shall include a means to disconnect the primary feed of the transformer from the utility power source.

h. Step-Up and Step-Down Transformers shall include a NEMA 3R enclosure sufficiently large enough to contain the transformer and disconnect means.

i. The enclosure shall have the facilities for padlocking, and a padlock with two sets of keys shall be provided by the Contractor. The enclosure shall meet all requirements specified by the transformer Manufacturer including, but not limited to, size and ventilation requirements.

13. The Contractor shall be responsible for coordinating the provision of utility power to the meter pedestal, including payment of any service fees and monthly service fees until the equipment being powered has been tested and accepted.

14. The Contractor shall install any conduits, weatherheads, cables, and grounding required by the utility company to provide electric power to the meter pedestal. All hardware and equipment required by the utility company shall be incidental to the cost of the Electrical Service Equipment.

15. Single conductor cable shall be copper, Type THWN as designated by the Underwriter's Laboratory (UL) Specifications. The single conductor cable shall have heat and moisture resistant insulation for a maximum operating temperature of 75°C, in wet and dry conditions.

16. Bare stranded copper ground wire shall consist of seven copper strands of soft-drawn bare copper wire, size #4 AWG or larger if required by the NEC, complying with ASTM B-3 and ASTM B-8. The ground wire shall be UL approved.

654.031 Grounding, Bonding, and Surge Suppression: Provide grounding and Transient Voltage Surge Suppression (TVSS) at all ITS cabinets. The Contractor shall provide grounding connections between each TVSS device and the main grounding terminus in the cabinet. Each TVSS device shall have a dedicated grounding connection, directly with the grounding terminus. Daisy-chaining of grounding connection is not permitted.

1. The Contractor shall furnish and install TVSS devices for all power and communications conductors leaving the ITS equipment cabinets, including but not limited to utility service, and power and communications for all ITS devices that are external to the cabinet.

2. The power panel of all ITS cabinets shall contain a single-phase filtering surge protector, connected to the load side of the primary circuit breaker. The electrical neutral buss, the

ground buss, the cabinet shell, and the ground rod shall all be wired in conformance to the applicable electrical codes.

3. All grounding shall meet the requirements of the installed equipment Manufacturers. In the event that the Manufacturers' requirements are more stringent than those of the national, state, and local codes, then the Manufacturers' grounding requirements shall apply.

4. Each ITS cabinet shall include at four 3/4-inch by 10-foot ground rod made of solid copper or copper-clad steel rod. A #4 AWG copper ground wire shall be connected to the ground lug on the cabinet or support structure, and exothermically welded to the ground rod. Additional ground rods shall be furnished and installed to provide required grounding. Minimum resistance to ground shall be 5 ohms or in accordance with the cabinet component's equipment manufacturer's requirements, whichever is more stringent.

5. For grounding connections internal to the cabinets or support structure, a conduit shall be installed through the foundation specifically to provide the means to connect the ground wire to the ground rods. Ground wires shall not be mounted externally to any structure and shall not be installed in conduit with any other power or communication wiring.

6. All ITS cabinets shall be electrically bonded to their associated ITS device support structure ground system using #4 AWG copper wires. The #4 AWG copper wires shall be installed between the support structures and the cabinets providing a common ground system for each terminus.

654.032 Electrical Service Equipment Construction Requirements:

1. The Contractor shall arrange a meeting with the Resident, a representative of the TMC, and the local utility company representatives to establish a schedule for utility connections before any control equipment or material is ordered.

2. The Contractor shall make the necessary arrangements with the utility companies to ensure utility service is available and connected at the time of equipment testing and power-up. Any utility energization, connection, or disconnection delays will not be a valid reason for a time extension. Difficulties in securing utility company services are to be reported to the Resident at the earliest possible time.

3. The Step-Up and Step-Down transformer primary and secondary wiring shall be connected in strict accordance with the Manufacturer's recommendations, depending on the mode of operation.

4. The Step-Up transformer shall not be a Step-Down transformer wired in reverse. Likewise, a Step-Down transformer shall not be a Step-Up transformer wired in reverse. If such operation is allowed by the transformer Manufacturer, then the Contractor shall present a letter from the Manufacturer to the Local Authority/Owner stating such, and also

stating that the Manufacturer's warranty shall not be adversely affected by using this transformer in the reverse wiring configuration.

5. The Step-Up and Step-Down transformers shall be installed in accordance with the Manufacturer's recommendations and consistent with the local utility company requirements. In the event the Manufacturer's recommended mounting requirements exceed the mounting layouts described below, the Contractor shall install the transformers in accordance with the Manufacturer's recommendations.

6. Ground mounted transformers shall be mounted to a 6-inch thick concrete pad. Width and length of the pad shall be at least 3 inches greater than the transformer's dimensions. The concrete pad shall be installed on 6 inches of crushed gravel.

7. Pole mounted transformers shall be mounted to metal struts (galvanized or stainless steel) spanning between two 6-inch x 6-inch wood posts embedded in the ground a minimum of four feet, or aluminum struts spanning between two 4-inch round aluminum poles on concrete foundations.

654.061 Method of Measurement:

1. Ground Mounted ITS Equipment Cabinet shall be measured by each cabinet installed in place.

2. Electrical Service Equipment shall be measured by the unit for each system serviced by utility power service.

654.07 Basis of Payment:

1. The accepted quantities of ITS Equipment Cabinet will be paid for at the contract unit price each complete in place. Payment shall be full compensation for the cabinet, cabinet components, foundation, platform and work pads, mounting hardware, generator transfer switch, grounding, TVSS, thermostats, fans, heater, power panel, grounding, bonding, locks, cables, installation and testing. Payment shall also include all labor, tools, equipment, transportation, and incidentals necessary to provide a complete ITS equipment cabinet.

    a. If more than four ground rods are required to achieve the required earth grounding, all additional ground rod installations and ground wire connections will be subsidiary to the ITS Equipment Cabinet.

2. The accepted quantities of Electrical Service Equipment will be paid for at the contract lump sum price complete in place. Payment shall be full compensation for coordination with the utility company, for metered and unmetered disconnect pedestals necessary to connect service from the public utility to the ITS Equipment Cabinet, for any transformers including their support systems and foundations, for all conduit, wiring, grounding, and hardware required by the public utility, and for all connection

and service fees until the powered equipment has been tested and accepted. Payment shall also include all labor, tools, equipment, and incidentals necessary to provide a complete and functional electrical power supply.

Payment will be made under:

Pay Item		Pay Unit
654.31	ITS Equipment Cabinet	Each
654.51	Electrical Service Equipment	Lump Sum

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.311 Ethernet Switch with Fiber Optic Interfaces This item of work shall conform to this specification. This item shall consist of furnishing and installing a 1 Gigabit per second (Gbps) Ethernet Switch with fiber optic interfaces, as well as all needed accessories required for a full and complete installation, including but not limited to power adapters, Ethernet patch cables, fiber optic patch cords, and small form-factor pluggable (SFP) modules as described herein.

654.026 Ethernet Switch Requirements: The materials for this work shall conform to the following requirements:

1. The work under this item specifies the requirements for the switch with single mode fiber optic interfaces. The switch shall accept both RJ-45 Ethernet connection as well as single mode SC fiber optic connections.

2. The switch shall be installed within the field cabinets as shown on the plans. The switch shall be designed for shelf mounting and rack-mounting in a standard 19-inch rack.

3. The switch specified herein shall be a self-contained unit capable of 24-hour per day unattended operation. The switch shall be supplied, assembled, configured, and tested by the Contractor.

4. The switch shall be of rugged design and suitable for reliable operation when mounted in the configuration as specified in these Specifications and the Plans. The switch shall be configured for minimum maintenance or adjustment after initial set-up.

5. The Contractor shall provide the switch with all required software. The software shall be web-based or the Contractor shall provide licensing for the software to be installed on a minimum of ten (10) computers to be determined by the TMC.

6. The switch shall have the following connections:

    6.1 The Contractor shall determine the number of multi-speed 10/100/1000 Mbps Ethernet ports with RJ45 connectors required for the specific installation. The Contractor shall furnish a switch with the required number of ports plus a minimum of two spare Ethernet ports with RJ45 connectors and two spare SFP ports. These shall meet the following network standards:

        6.1.1 IEEE.802.3 10 Base-T

        6.1.2 IEEE.802.3u 100 Base-T

        6.1.3 IEEE.802.3ab 1000 Base-T

6.1.4 IEEE.802.1d Spanning Tree

6.1.5 IEEE.802.1w Rapid Spanning Tree

6.1.6 IEEE.802.1q VLAN

6.1.7 IEEE.802.1p Class of service (CoS)

6.2 Fiber optic ports shall support single mode fiber optic cable with type SC connectors.

6.2.1 Optical emitters shall be laser diode type.

6.2.2 Fiber optic ports shall be single mode and shall have an operating wavelength of 1310 nm, and/or 1550 nm.

6.2.3 Fiber optic ports shall each have an optical power budget of 13 dB, minimum.

6.2.4 Optical emitters shall have a transmit power of -15 dB, minimum.

6.2.5 Optical detectors shall have received sensitivity of -28 dBm.

6.2.6 Fiber optic ports may be integral to the switch or may be of the SFP type.

6.2.7 Fiber optic ports shall remain covered at all times, unless connected to fiber optic cables.

6.2.8 All fiber optic ports of switches supplied in this project shall be fully compatible and interoperable with all other switches on this project. All fiber optic ports shall be interoperable with any other existing switch with which they must connect and communicate.

6.3 The Contractor shall supply, install, and test all Ethernet cables required to make all connections as shown in the Plans. Ethernet cables shall be weatherproof Category 6 (Cat6).

6.4 The Contractor shall supply, install, and test all fiber optic patch cords required to make all connections as shown in the Plans. Fiber optic patch cords shall meet the following requirements:

6.4.1 Each patch cord shall contain one single mode fiber strand with a factory terminated SC type connector.

6.4.2 Each patch cord shall be a minimum of 3 feet in length.

6.4.3 The patch cords shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.

6.4.4 All fiber optic strands shall be nonconductive to electricity.

6.4.5 The Fiber Optic Patch Cord shall meet or exceed the following performance characteristics:

6.4.5.1 Fiber Optic Patch Cords shall consist of tight buffered optical fibers of the type used for interconnect cable with a 900 µm secondary buffer.

6.4.5.2 The fiber shall be surrounded by aramid fiber yarn strength members and a UL listed OFNR, UV resistant and fungus resistant yellow outer jacket 3mm in diameter.

6.4.5.3 The optical fibers shall be 100 kpsi proof tested and have an attenuation change no greater than 0.05 dB/km.

6.4.5.4 The attenuation of the Fiber Optic Patch Cord shall not exceed 1.0 dB/km at 1310 nm and 0.75 db/km at 1550 nm.

6.4.5.5 The SC type connector shall meet the following requirements:

6.4.5.5.1 All fiber optic connectors shall be SC type with a PC (physical contact) 2.5 mm ceramic ferrule.

6.4.5.5.2 The connector mean insertion loss shall be 0.3 dB and maximum 0.5 dB.

6.4.5.5.3 The connector mean return loss shall be -59 dB and maximum of -55 dB.

6.4.5.5.4 All SC connectors shall have a durability rate of less than 0.2 dB change over 500 rematings.

6.4.5.5.5 Connectors shall meet ANSI/TIA EIA-604-3A requirements.

7. The switch shall be UL listed.

8. The switch shall be a fully managed Ethernet layer 2 device.

9. The switch shall have a switching method of store and forward.

10. The switch shall have an operating temperature range of -34°C to +74° C.

11. The switch shall have a power usage of +12VDC to +24VDC at 1 amp or less. This shall be provided by an included plug-in type AC adapter.

654.061 Method of Measurement: Fiber Ethernet Switch shall be measured by each installed, connected, configured, tested and accepted in place.

654.07 Basis of Payment: The accepted quantities of Fiber Ethernet Switch will be paid for at the contract unit price each complete in place. Payment shall be full compensation for furnishing and installing all Ethernet Switches, Ethernet cables, fiber optic patch cords, installation, configuration and testing.

Payment will be made under:

Pay Item		Pay Unit
654.311	Fiber Ethernet Switch	Each

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.3333 Single Mode Fiber Optic Cable This item of work shall conform to this specification, and with IMSA General Specification 70 for Single Mode Fiber Optic Cable. This item shall consist of furnishing and installing single mode fiber optic cable with the number of strands indicated in the plans, with all necessary splices and appurtenances.

654.026 Fiber Optic Cable Materials Requirements: The materials for this work shall conform to the following requirements:

1. General Requirements: All of the fiber optic cable for this project shall be from the same manufacturer and shall be either 12-strand, single-mode or 48-strand, single mode. The Fiber Optic Cable shall meet the following requirements:

1.1. The fiber optic cable shall be designed for both aerial and underground (conduit) installations, and shall be suitable for these applications by the manufacturer.

1.2. The fiber optic cable shall operate over a temperature range of -40 to 74 degrees C at a relative humidity of 10% to 90% condensing.

1.3. All fiber optic cable materials shall be non-conductive to electricity.

1.4. The fiber optic cable shall meet or exceed the following performance characteristics when tested in accordance with the following fiber optic test procedures (FOTP) from EIA/TIA-455-B Series standards:

1.4.1. When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-40^0C and $+70^0$C) shall not exceed 0.2 dB/km at 1550 nm.

1.4.2. When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," the cable shall withstand 25 impact cycles. The change in attenuation shall not exceed 0.2 dB at 1550 nm.

1.4.3. When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a tensile load of 2700 N (608 lbs). The change in attenuation shall not exceed 0.2 dB during loading and 0.1 dB after loading at 1550 nm.

1.4.4. When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable", the cable shall withstand four full turns around a mandrel of < 10 times the cable diameter for non-armored cables and < 20 times the cable diameter for armored cables after conditioning for four hours at

test temperatures of -30^{0}C and +60^{0}C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears or other openings. Optical continuity shall be maintained throughout the test.

1.4.5. When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 440 N/cm (250 lbf/in) for armored cables and 220 N/cm (125 lbf/in) for non-armored cables applied uniformly over the length of the sample. The load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for ten minutes. The change in attenuation shall not exceed 0.4 dB during loading and 0.2 dB after loading at 1550 nm.

1.4.6. When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable", the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 80ºC.

1.4.7. When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 4 meters shall withstand IO cycles of mechanical twisting. The change in attenuation shall not exceed 0.1 dB at 1550 nm.

1.4.8. When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.1 dB at 1550 nm.

2. Cable Construction: The cable shall be composed of the following elements:

2.1. Anti-buckling central member which shall prevent the cable from buckling and stretching. The central member shall consist of a dielectric glass reinforced plastic rod. The central member expansion and contraction characteristics shall be similar to the optical fibers and the fiber tubes.

2.2. Loose Buffered Tubes in which multiple fibers strands are placed inside. Each Buffer Tube shall meet the following requirements:

2.2.1. Allowed buffered tube diameters shall be 3.0 mm or 1.9mm.

2.2.2. The number of fibers inside a Buffer Tube shall not exceed 12 strands.

2.2.3. Buffer Tube material shall prevent the fiber from adhering to the inside of the tube.

2.2.4. Buffer Tubes shall be colored in accordance with TIA/EIA-598-A, “Color Coding of Optical Fiber Cables”.

2.2.5. Fiber Optic strands shall be placed loosely inside the Buffer Tube to allow for fiber expansion and contraction due to temperature changes.

2.2.6. Buffer Tube shall be filled with a water blocking material meeting the following requirements:

2.2.6.1. The filling shall prevent water intrusion, be nontoxic, and non-irritant to skin contact.

2.2.6.2. The filling shall be non-nutritive to fungus.

2.2.6.3. The filling shall be electrically non-conductive and readily removable with conventional non-toxic solvents.

2.3. Fiber Optic Strands, which shall consist of a doped-glass cylindrical core, surrounded by a concentric cladding. An acrylate coating shall cover the fiber to add protection and color. Each fiber optic strand shall meet the following requirements:

2.3.1. Core diameter shall be 8.3 μm ± 0.5μm.

2.3.2. Cladding diameter shall be 125 μm ± 1.0 μm.

2.3.3. Core to Cladding offset shall be less than 0.8 μm.

2.3.4. Cladding Non-Circularity shall be less than 1.0 %.

2.3.5. Total coating diameter shall be 245 ± 10 μm and shall be mechanically strippable.

2.3.6. Coating color shall be in accordance with TIA/EIA-598-A, “Optical Cable Color Coding”.

2.3.7. No point discontinuity along the fiber shall have attenuation greater than 0.10 dB at either 1310 nm or 1550 nm.

2.3.8. Attenuation at the Water Peak shall not exceed 2.1 dB/km at 1383 ± 3 nm.

2.3.9. Mode-Field Diameter shall be 9.30 ± 0.50 μm at 1310 nm, and 10.5 ± 1.0 μm at 1550 nm.

2.3.10. Zero Dispersion Wavelength shall be between 1301.5 nm and 1321.5 nm.

2.3.11. Zero Dispersion Slope shall be less than 0.092 ps/(nm^2 * km).

2.3.12. Cable loss shall not exceed 0.4dB/km when measured at a light wavelength of 1310nm.

2.3.13. Cable loss shall not exceed 0.3dB/km when measured at a light wavelength of 1550nm.

2.4. The cable casing shall be composed of a minimum of two protective layers. Each layer requirements are as follows:

2.4.1. The first casing layer shall be composed of high tensile strength dielectric yarns helically stranded evenly around the cable core.

2.4.2. The second and outer most layer shall be a polyethylene jacket. The jacket shall meet the following requirements:

2.4.2.1. The jacket shall be black medium or high density polyethylene in accordance with ASTM D1248, Type II or Type III, Class C, Category 3, 4, or 5 and contain a suitable antioxidant.

2.4.2.2. The jacket shall contain carbon black to provide ultraviolet light protection.

2.4.2.3. The jacket shall have a minimum thickness of 1.4 mm.

2.4.2.4. The jacket shall have permanent affixed markings every two feet or every one meter along the cable. These markings shall contain at a minimum the cable length (in feet if markings appear every two feet or in meters if markings appear every one meter) manufacturer's name, date of manufacturer, and fiber count.

2.4.3. A ripcord shall be provided between the first and second layer.

2.4.4. All casing layers shall be non-nutritive to fungus.

654.31 Fiber Optic Cable Construction Methods: The Contractor shall meet the following construction and installation procedure when installing the fiber optic cable:

1.1. Shipping Reels: The fiber optic cable shall be shipped in reels that meet the following requirements:

1.1.1. The reels shall be designed to prevent damage to the cable during shipment and installation.

1.1.2. Each reel shall contain an identification tag with the following minimum information:

- Date of Manufacture
- Manufacturer's Cable Code
- Fiber Count
- Length of Cable
- Beginning and End length markings

1.1.3. Both ends of the cable shall be accessible to provide access for testing.

1.1.4. The cable ends shall be securely fastened and shall not protrude beyond any portion of the reel in an unprotected manner to prevent the cable from becoming loose in transport.

1.1.5. Cables ends shall be sealed to prevent the escape of the water blocking material and entry of moisture during shipping, handling, storage, and installation.

1.2. Installation: The Contractor shall adhere to the following installation procedures during the placement of the fiber optic cable:

1.2.1. All fiber optic cables to be installed on aerial messenger wire or in a conduit or duct facility shall be pulled as a unit. The Contractor shall ensure the cable is not damaged during storage, delivery and installation.

1.2.2. The cable shall not be pulled along the ground or over or around obstructions. The cable shall not be stepped on by workmen, nor run over by vehicles or equipment. All cable shall be inspected and approved by the Engineer prior to installation.

1.2.3. All cables shall be lashed to or pulled on aerial messenger cable or in conduit with a cable grip designed to provide a firm hold on the exterior covering of the cable, with heat shrinkable end caps placed on the cable ends.

1.2.4. The maximum pulling tensions and minimum bending radius shall not be violated at any time during installation, and shall be monitored at all times during installation. Prior to any installation of cable, the Contractor shall clean existing conduit and aerial messengers (if applicable), per industry standards.

1.2.5. The Contractor shall establish adequate voice communications between the cable feeding location and the cable pulling equipment prior to commencing any pulling operation. The cable reels shall be placed on the same side of the pull box with the conduit where the cable is being installed. The reel shall be made level and brought into proper alignment with the conduit or messenger section, such that the cable will pass from the top of the reel. The cable shall be fed by manually rotating the reel.

1.2.6. For aerial installations, the fiber optic cable shall be lashed to a 3/8-inch diameter messenger cable. The supported fiber optic cable shall not be under

strain in the installed condition. Any weatherhead for fiber optic cable entry into riser conduit shall ensure the cable exceeds the minimum bending radius at all times.

1.2.7. For underground installations, the fiber optic cable shall not be pulled through an intermediate junction box, pull box, or any other opening in the conduit, unless approved by the Engineer. The necessary length of cable to be installed shall be pulled from pull box, or cabinet to the immediate next downstream pull box, or cabinet. The remaining length of cable to be installed in the next conduit or along aerial messenger shall be carefully stacked or stored in a manner that allows that length of cable to be safely pulled into the next conduit.

1.2.8. An approved cable feeder guide shall be used between the cable reel or the storage stack and the face of the conduit to protect the cable, and to guide the cable installation. The dimensions and set-up of the feeder guide shall be such that the cable does not bend at any location to a radius less than the cable's minimum allowable bending radius. The cable shall not be pulled over edges or corners, over or around obstructions, or through unnecessary curves or bends. The cable shall be looped in and out to cabinets and pull boxes to provide adequate slack (as specified in Section 3.5 Cable Spare of this specification) and the least amount of stress on the fibers. The Contractor shall ensure that the cable is not damaged during storage or installation.

1.2.9. Fiber optic cable ends shall be kept sealed at all times during installation, using an approved cable end cap. Tape shall not be permitted to seal the cable end. The cable end shall remain sealed until the Contractor terminates the fiber cables. Cables that are not immediately terminated shall have a minimum of six feet of slack.

1.2.10. The allowable pulling tension shall be the lesser of either of the two values below:

1.2.10.1. The cable manufacturer's recommended pulling tension from the outer jacket for the cable.

1.2.10.2. Eighty percent of the cable manufacturer's maximum pulling tension from the outer jacket.

1.2.11. The Contractor shall monitor the tension on the fiber optic cable with the use of an approved tension gauge. The gauge shall be placed sufficient distance from the take up reel, such that the tension can be read throughout the entire pulling operation.

1.2.12. When using lubricants, the Contractor shall adhere to the cable manufacturer's requirements for the proper amount, application tools and method, and removal of the lubricant from the exposed cable.

1.2.13. All cable shall run continuously from termination point to termination point as indicated on the plans or the Engineer. The Contractor shall carefully determine the length of cable to reach from termination point to termination point. Cutting

of fiber optic cables at any location other than those shown on the plans shall not be permitted.

1.2.14. The Contractor shall document the locations of all splices and connections for each strand of fiber optic cable. This documentation shall show the distance in feet of fiber optic cable from the end of the cable for every splice and connection, and shall also show the cable length marking as marked on the cable for every splice and connection. Four copies of the documentation shall be furnished to the Engineer prior to testing.

1.3. Cable Termination: The Contractor shall terminate fiber optic cables in the following manner:

1.3.1.

1.3.2. All splice installations shall be performed using a fusion splicing technique. Splice insertion loss shall not exceed 0.1 dB.

1.3.3. The Contractor shall provide all equipment and consumable supplies necessary for performing the splices.

1.3.4. Each spliced fiber shall be packaged in a protective, waterproof sleeve.

1.3.5. Bare fibers shall be completely re-coated with a protective room temperature vulcanizing (RTV) coating gel, or similar approved substance, prior to the application of the sleeve so as to protect the fiber from scoring, dirt, or microbending.

1.4. Cable Spare: The Contractor shall install spare cable as follows and as indicated by the engineer:

1.4.1. A minimum 30 feet shall be stored at ITS equipment cabinets.

1.4.2. A minimum of 200 feet shall be stored at all splice enclosure locations unless otherwise noted on the Plans. A minimum of 75 feet of slack cable shall be located on each side of the splice enclosure.

1.4.3. A minimum of 200 feet shall be stored at all aerial splice enclosure locations unless otherwise noted on the Plans. An additional 4 feet of slack cable shall be provided for every 1 foot of lateral distance from the aerial splice enclosure to a pavement surface that can support a field splicing vehicle. A minimum of 100 feet of slack cable shall be located on each side of the aerial splice enclosures. The slack cable shall be supported by mechanical means approved by the manufacturer and utility pole owner.

1.4.4. Cable storage shall be performed in an industry standard manner that does not violate the minimum bending radius specification of the cable.

1.4.5. All spare cable shall be hung on cable racks where provided.

654.41 Fiber Optic Cable Testing and Certification:

1.1. The personnel involved and responsible for the installation, splicing, and termination of the cable shall meet the following minimum requirements:

1.1.1. Documented proof of three (3) years experience with the installation of single-mode fiber optic cable, including splicing, termination, and testing.

1.1.2. The installation experience should be applicable to the work required for this project and shall include projects of similar or larger scope, providing mid-span access points and fusion splicing in field conditions.

1.1.3. The Contractor shall provide the names and phone numbers of references to the Engineer.

1.1.4. At least thirty (30) days prior to the installation of the fiber optic cable, the Contractor shall submit to the Engineer, documentation outlining the information above. Permission for the Engineer to contact the owner must be authorized prior to submitting the information.

1.2. The Contractor shall provide the Engineer with four (4) copies of the cable manufacturer's recommendations and requirements, listed below, for each fiber optic cable type and size:

1.2.1. A list of the cable manufacturer's approved pulling lubricants for use on the cable. No other lubricants will be permitted.

1.2.2. The maximum pulling tensions of the cable, which shall specify both pulling from the cable's strength member(s) and for pulling from the outer jacket.

1.2.3. The minimum bending radius of the cable, which shall specify a radius for both the construction and for the long-term installation.

1.3. Testing of the fiber optic system shall include verification by means of inspection that all fiber optic equipment has been installed in accordance with the Contract Documents.

1.4. Except for the two tests on the fiber optic cable that are performed prior to completion of the installation, as described below, all fiber optic communications testing shall be performed after the field installation of all equipment is complete. The tests shall validate the functionality of the fiber optic components of the project, relative to the requirements as contained in the contract. Fiber optic communications testing shall be conducted using equipment supplied by the Contractor for this purpose. If a cable

segment or any strand within that cable segment fails to pass its communications test, the Contractor shall correct the problem or replace the cable segment and retest it until satisfactory results are achieved.

1.5. Prior to shipping, the manufacturer of the cable shall conduct fiber loss tests on all strands of the entire length of cable to be delivered for this project. These tests shall be conducted at both 1310 nm and 1550 nm light wavelengths. Four (4) manufacturer-certified copies of the fiber loss tests shall be delivered with the cable for review by the Engineer. If an OTDR is used for this test, then the OTDR settings shall conform to the requirements described below for the final fiber optic tests, except that bidirectional OTDR testing is not required (only unidirectional is required).

1.6. Upon delivery of the cable to the project site, the Contractor shall conduct fiber loss tests on all strands of the entire length of cable in the presence of the Engineer. These tests shall be conducted at both 1310 nm and 1550 nm light wavelengths. The Contractor shall provide the Engineer with four (4) certified copies of the loss test results for comparison with the tests made on the cable prior to delivery. If an OTDR is used for this test, then the OTDR settings shall conform to the requirements described below for the final fiber optic tests, except that bidirectional OTDR testing is not required (only unidirectional is required).

1.7. After installation of the cable is complete, the Contractor shall conduct final fiber optic tests on all strands of the entire length of each installed cable demonstrating that all requirements of this specification are met. All strands shall be tested as specified herein, both used strands as well as unused (dark) strands. These tests shall be conducted at both 1310 nm and 1550 nm light wavelengths. All testing shall be performed with an Optical Time Domain Reflectometer (OTDR), as follows:

1.8. Testing shall be conducted on all components of the fiber optic cable plant, including all strands of all fiber cables, all splices, and all terminated patch panel positions, as shown in the Plans.

1.8.1. The OTDR testing shall be performed bidirectionally, i.e., testing shall be conducted from both ends of each fiber segment. The optical loss for all components of the fiber optic cable plant (i.e., spans, splices, and connectors) used by the Engineer for comparison against the specification requirements shall be the average of the two readings from the two ends of each fiber segment.

1.8.2. The OTDR used shall internally store all fiber optic cable signatures, and the signatures shall be downloadable to a computer. Signatures of all cables tested shall be supplied by the Contractor in electronic format. The Contractor shall supply OTDR emulation software manufactured by the OTDR manufacturer which is capable of reading the stored signatures and performing all measurement and analysis on the stored signatures as if the OTDR were connected live to the fiber optic cable.

1.8.3. The analysis shall include, but not be limited to, readout of fiber loss per unit length, splice loss measurement (amount of loss and distance from OTDR), connector loss measurement (amount of loss and distance from OTDR), total

fiber optic cable length, and generation of event tables, as well as identification and measurement of any other reflective events or faults.

1.8.4. The pulse width setting of the OTDR shall be set to the lowest possible setting while allowing the full length of fiber optic cable to be measured for faults or reflective events; however in no event shall the pulse width be set to a value greater than 100 ns. Further, the pulse width shall be set to a value sufficiently small so that the optical dead zone shall not extend into the cable under test by any distance.

1.8.5. All OTDR testing shall be performed using a launch cable of 1500 feet in length, or greater.

1.8.6. The OTDR A and B markers shall be placed as follows: For terminated fiber strands, the A marker shall be placed upstream of the connection between the launch cable and the cable under test. For unterminated fiber strands, the A marker shall be placed downstream of the launch cable connection, but it shall not be placed downstream of this point by a distance exceeding two percent of the length of the cable under test. The B marker shall be placed upstream of the end of the cable, but it shall not be placed upstream of this point by a distance exceeding two percent of the length of the cable under test. All OTDR traces shall show the total optical loss between the A and B markers, in units of decibels per kilometer (dB/km).

1.8.7. The Contractor shall document the OTDR readings by supplying hard copies of the OTDR signatures for all fiber optic cables. The Contractor shall also supply hard copies of the reflective event table for all optical fibers which shall be directly printed out from the OTDR.

1.9. The Contractor shall supply fiber optic cable plant loss calculations for all installed components of the cable plant demonstrating that the total plant losses for each fiber are less than the minimum optical fiber optic modem power budget by a safety margin of at least 4dB.

654.061 Method of Measurement: Fiber Optic Cable shall be measured by the number of linear feet installed, except that the Contractor will be paid for slack cable according to the minimum required and shall not be paid for excess slack cable provided.

654.07 Basis of Payment: Payment will be made for the total number of linear feet of Single Mode Fiber Optic Cable furnished, installed, tested, and accepted at the Contract Price per Linear Foot. The price shall include the cost of furnishing and installing the cable, furnishing and installing the messenger cable, lashings, all materials, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
654.3333	Single Mode Fiber Optic Cable (12-Strand)	Linear Feet
654.3333	Single Mode Fiber Optic Cable (24-Strand)	Linear Feet
654.3333	Single Mode Fiber Optic Cable (48-Strand)	Linear Feet

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.3331 Fiber Optic Patch Panel This item of work shall conform to this specification. This item shall consist of furnishing and installing Fiber Optic Patch Panels with the number of positions indicated in the plans at the locations shown on the plans or as indicated by the Engineer.

654.026 Fiber Optic Patch Panel Requirements: The Fiber Optic Patch Panels shall meet the following requirements:

1. The Fiber Optic Patch Panel shall be a stand-alone unit manufactured for outdoor field cabinets and mounted in EIA 19-inch racks, wall mounted, or shelf mountable as required by the specific location. The patch panel shall be securely fastened in place as recommended by the manufacturer
2. The Fiber Optic Patch Panel shall be supplied with the number of positions indicated in the Contract Documents.
3. The Fiber Optic Patch Panel shall include and be capable of accommodating SC type connector sleeves equal to or greater than the number of positions indicated.
4. The Fiber Optic Patch Panel shall include and be capable of terminating connectorized pigtails equal to or greater than the number of positions indicated.
5. The Fiber Optic Patch Panel shall incorporate a hinged access door.
6. When the Fiber Optic Patch Panel is installed in an EIA 19-inch rack, the unit shall not exceed two rack units in height.
7. The Fiber Optic Patch Panel shall include splice trays meeting the following requirements:

    7.1 The splice trays in the Fiber Optic Patch Panel shall be capable of holding 12 splices per tray.

    7.2 The splice trays shall incorporate a system to retain and provide strain relief to the fiber optic buffer tubes and connectorized pigtails.

    7.3 The splice trays shall incorporate grooves where the fiber optic splice can be held in place.

    7.4 Each splice tray shall incorporate a clear snap-on lid.

8. The Fiber Optic Patch Panel shall include a restraining system to hold the splice trays securely in place.
9. The Fiber Optic Patch Panel shall incorporate cable guides that maintain fiber strands and fiber buffer tubes bending radius greater than the minimum allowed by the manufacturer.

10. The Fiber Optic Patch Panel shall incorporate a restraining mechanism to hold the fiber optic cable central member and outside jacket.
11. The number of pigtails to be furnished and spliced to the fiber optic cable are shown in the Plans. The connectorized pigtails shall meet the following requirements:

    11.1 All fiber optic connectors shall be SC type with a PC (physical contact) 2.5 mm ceramic ferrule.

    11.2 The connector mean insertion loss shall be 0.3 dB and maximum 0.5 dB.

    11.3 The connector mean return loss shall be ≤ -59 dB and maximum of ≤ -55 dB.

    11.4 All SC connectors shall have a durability rate of less than 0.2 dB change over 500 rematings.

    11.5 Connectors shall meet ANSI/TIA EIA-604-3A requirements.

    11.6 The fiber optic strand of the connectorized pigtail shall have matching optical properties as the fiber optic strand used on the fiber optic cable.

    11.7 The Contractor shall provide factory assembled fiber optic pigtails. Modified fiber optic patch cords will not be accepted.

12. Connectorized fiber optic pigtails shall connect the fiber optic cable to the front panel of the Fiber Optic Patch Panel.
13. The Contractor shall provide covers/caps for unused fiber optic ports on the Fiber Optic Patch Panel.

654.061 Method of Measurement: Fiber Optic Patch Panel shall be measured by each unit installed, connected, tested and accepted in place.

654.07 Basis of Payment: The accepted quantities of Fiber Optic Patch Panel will be paid for at the contract unit price each, of the size specified, complete in place. Payment shall be full compensation for the patch panels, splice trays, connectorized pigtails, including installation and testing. Payment shall also include all tools, equipment, labor, and incidentals necessary for a complete installation.

Payment will be made under:

Pay Item		Pay Unit
654.3331	Fiber Optic Patch Panel (12-Position)	Each
654.3331	Fiber Optic Patch Panel (24-Position)	Each

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.223 Semi-Permanent Pad-Mounted Variable Message Sign: This item of work shall conform to this specification. This item shall consist of furnishing, installing, configuring, and testing remotely controlled, Semi-Permanent, Trailer-mounted, Variable Message Sign (PVMS). This work includes support of a Work Zone Monitoring system.

The sign shall be installed in stationary locations at designated sites within the project with the ability to be relocated as needed. Signs will be used year round at unattended locations and must be completely suitable for operation in cold and snow locations without any maintenance.

654.026 VMS Requirements: The Semi-Permanent Pad-Mounted VMS shall meet the following requirements:

1. GENERAL

    1.1 All exterior surfaces except the sign face shall be cleaned, primed and finished with two coats of Highway Safety Orange. An exception is the border around the display, which shall be black. The finish shall be either polyester powder coat or baked enamel.

    1.2 All wiring shall be inaccessible to vandals. All external wiring shall be enclosed in liquid-tight flexible conduit or flexible non-metallic tubing, All wiring and connections shall be of sufficient size to support all maximum currents continuously, with a maximum of five percent (5%) voltage drop, including an 'all pixels ON' display, for at least 3 hours. All wiring installation shall meet or exceed National Electrical Code Articles 300 and 310 methods and requirements.

    1.3 All terminals and connections shall be clearly labeled. Labels shall be permanent, waterproof and machine-printed.

    1.4 Unless specifically excluded in these specifications, the signs shall conform to all standards within the *NEMA TS 4-2010 Hardware Standards for Dynamic Message Signs (DMS) with NTCIP Requirements, NTCIP Standards*.

    1.5 All parts of the PVMS will work normally in sustained ambient temperatures from -20 degrees F to +120 degrees F.

2. DISPLAY SPECIFICATIONS

    2.1 The display shall be a matrix of LED pixels to form a display of at least 72 inches high and 144 inches wide. Center-to-center pixel spacing shall be the same horizontally and vertically and shall be 2.6 inches or less. If the spacing is 2.6

inches, the display shall be at least 50 pixels wide and 27 pixels high. If the spacing is less, the number of pixels shall be proportionally larger.

2.2 The LEDs shall be amber and have a viewing angle of 30 degrees in the horizontal plane. That is, brightness at 15 degrees off axis shall be at least 50 percent of the on-axis brightness.

2.3 When all pixels are illuminated at maximum brightness, the display shall have an on-axis luminance intensity of at least 3,720 candelas per square meter. The sign shall have an automatic intensity control feature in order to keep the LED lamp matrix intensity constant with a reduction in voltage and adjust the brightness for the ambient light level.

2.4 The pixels shall be arranged as a "full matrix" display capable of multiple fonts and justifications, with equal horizontal and vertical spacing.

2.5 The display shall be capable of displaying three lines of 18-inch tall characters, with a normal font style for a minimum of 8 characters on each line.

2.6 The display shall consist of at least ten display modules that can be easily and quickly replaced in the field. They must be securely mounted to prevent any misalignment.

2.7 The display enclosure shall be made of aluminum with aluminum and or stainless steel fasteners. The display enclosure shall be weatherproof and designed to totally protect the display modules from moisture and wind driven rain.

2.8 The housing shall include a sighting device to facilitate proper directional alignment of the message board. This device shall be securely mounted so that a 20-pound force in any direction will not misalign the sighting device.

2.9 The inside of the display enclosure shall be painted black to facilitate heat dissipation.

2.10 If the display modules are not weatherproof, they shall be protected by a watertight sheet of UV-protected acrylic or polycarbonate.

3. SUPPORT POST

3.1 The message board shall be mounted on a mast that is raised and lowered by an electrically powered hydraulic pump (with attached fluid reservoir).

3.2 The hydraulic system shall include an auxiliary manual pump with release for emergency use.

3.3 When fully raised in the display position, the message board shall be able to rotate 360º so the sign can be aimed at traffic. Solar panels must be fully rotatable and tiltable, up to 60°, independently from the sign for maximum solar exposure. Also refer to section 4.9.

3.4 The sign's rotation-locking device shall be independent from the sign's raise/lower-locking device. Such device will be secure enough to prevent turning with 50 mph wind gusts.

3.5 The hydraulic system shall be inside a locked housing.

3.6 All exposed parts of the support post will be painted and constructed so as to minimize corrosion from winter road conditions and chemicals even when fully extended.

4. POWER SYSTEM

4.1 The sign shall be powered by batteries that can be recharged by 120VAC power when available and by solar power (DC) at all other times. The charger shall be enclosed within the battery containers with an external power inlet.

4.2 The batteries must be available from multiple manufacturers. The number, type, and amp hour rating of batteries shall be sufficient to operate a display of 3 full lines of "X"s for 480 hours, at maximum brightness, continuously with no recharging and no solar assist. This load shall include all communications and control devices. Low voltage cutoff which may disconnect the batteries, before full discharge, will be included in this requirement. This will be confirmed with field measurements of actual current draw. Amp hour calculations shall be submitted and need to recognize the effect of amperage increase with voltage decrease from the switching power supplies. (Constant wattage, not amperage.)

4.3 Batteries shall be of Absorbed Glass Mat (AGM) construction – solar charging will comply with AGM charging profile requirements.

4.4 A voltmeter and ammeter shall be furnished to monitor the condition of the batteries and charging system. The 120-volt battery charger shall include a separate ammeter for monitoring the charging process. During recharging of low batteries from 120-volt power source, the sign shall operate normally.

4.5 Power control circuitry shall protect the batteries from overcharging by the 120-volt and solar chargers. It shall also protect all components from damage in the event of a short circuit, overload, or similar problem. It shall disconnect the load from the batteries when further discharging could damage the batteries.

4.6 The system shall automatically switch between solar and 120-volt power (when available) for battery charging with no operator intervention.

4.7 If the batteries have been disconnected, the sign and controller shall operate using 120 VAC.

4.8 The solar charging system shall produce more power in a 2 hour solar day than the sign needs to display a 3-line message of ("X"'s) continuously for 24 hours along with maintaining the functions of any other powered attachment such as radar units and cameras (though cameras only need to be operational during daylight hours). Refer also to 4.1 above. Solar panel calculations shall be done with actual operating voltage e.g., 12 volts (not Maximum Power Point).

4.9 The solar panels shall be mounted so the panels can be rotated independently from the display for 360 degrees; at the same time, the panels can be tilted from flat to 60 degrees from horizontal (for snow shedding and maximum winter solar collection). This structure shall be rugged enough to withstand 50 mph wind gusts

from any direction while tilted and support a snow load of 80 pounds per square foot.

4.10 Solar panel frame work shall have a lock as to lock them down while in the transport position or while not in use.

4.11 All electrical systems, surge protectors, antenna grounds, and the trailer shall connect to a common ground that also connects to a grounding lug on the outside of the trailer. Label the lug "EARTH GROUND".

5. TRAILER

5.1 The hitch shall have an adjustable height, with a 3" pintle ring.

5.2 The trailer shall be no more than 22 feet long with the tongue in place, and no more than eight feet wide.

5.3 The tongue shall have a jack with caster wheel (1,000 lbs capacity) affixed in such a manner that the jack may be readily placed and locked in a horizontal position for traveling without the use of any tools.

5.4 Both the tongue and coupler shall have a minimum of Grade 70 safety chains and hooks with safety latches attached.

5.5 The trailer shall have lockable, weatherproof compartments for the controller and batteries. The battery compartment shall be centrally positioned to promote stability of the trailer.

5.6 The trailer chassis shall have at each corner a leveling jack (2,000 lbs capacity) affixed in such a manner that the jacks may be readily placed and locked in a horizontal position for traveling without the use of any tools. Jack shall be of standard design and readily replaceable in the field.

5.7 The face and sides of the trailer shall be delineated on a permanent basis by affixing retro-reflective material (conspicuity material) in a continuous line as seen by oncoming drivers.

5.8 The main frame and cross members shall be constructed of tubular steel and meet all federal standards and industry standards.

5.9 The axle shall be constructed of straight tubular steel with a capacity of 3,500 lbs.

5.10 The springs shall be leaf type with a capacity of 1,750 lbs per-side.

5.11 Wheels shall be of steel design with five lugs; tire size shall be P205/75R15.

5.12 Fenders shall be constructed of 16-gauge steel or plastic and attached to main frame with splash guards. Fenders construction and attachment shall be of heavy duty design for the fenders to be walked upon, and shall support a 200 lb person. Anti-skid surfacing shall be applied to the top of the fenders.

5.13 The trailer shall have dual combination reflective lights with stop, tail, turn signal and corner clearance lights. (All lights shall be LED). The lights connector shall be the standard 4-pin connector. Trailer shall have a license plate light and bracket.

5.14 The trailer shall be equipped with hydraulic surge brakes. Provision shall be made to block the braking action when moving the trailer backwards.

5.15 Upon placement in the final semi-permanent location and following installation approval, the wheels shall be removed and brought to the MaineDOT District Office.

6. DATA COLLECTION REQUIREMENTS

6.1 The sign shall include an on-board Doppler radar speed detector installed such that the speed of approaching vehicles can be displayed on the sign or used to trigger other messages. All necessary software, firmware, and wiring shall be included and installed in the controller.

6.2 With radar units installed the following data shall be logged and stored:

6.2.1 Time and date that a vehicle was detected

6.2.2 The speed of the detected vehicle

6.2.3 This data shall be stored locally and shall be remotely retrievable. Retrieved data shall be in a format that can be put in an Excel spreadsheet.

6.3 The units shall have an on-board closed circuit television (CCTV) camera to monitor the local area and roadway. The camera shall be capable of FTP and should be able to send a single image every 2 minutes to a designated server.

6.4 The camera shall have the ability to stream live video if and when required.

6.5 The camera shall be IP-addressable to allow direct access from an external computer and remote access via the system telecommunications.

7. SIGN CONTROLLER

7.1 The controller shall be in a lockable weather proof enclosure with a hasp for a padlock. The Contractor shall furnish and supply the Master Lock Combination Padlock.

7.2 The sign shall support both types of control architecture described in Section 8.10 of TS 4. The controller shall be able to store at least 30 messages in non-volatile memory.

7.3 Section 5.6 of TS 4 does not apply to this sign. The controller shall be capable of storing at least four fonts in memory and shall be shipped with at least two fonts in memory. The user shall be able to create at least two additional fonts, download them to the controller, and store them there. Both default fonts shall consist of characters 18-inches tall. One shall be comparable to that shown in Figure 7-1 of Federal Highway Administration publication # FHWA-TS-90-043. The other shall be a similar, compressed font. Both fonts shall include:

7.3.1 ▪ All upper case letters,

7.3.2 ▪ The following punctuation marks . , / ? ‘ : and “.

7.3.3 ▪ All numerals 0 to 9,

7.3.4 ▪ The following special characters # & * +< >← → ↑ ↓ ↖ ↗ ↙ ↘

7.4 The sign controller shall automatically notify (via automated alarm) the central sign control computer when the battery voltage is low.

7.5 Section 8.7 of TS 4 does not apply to this sign. All communication with the sign controller shall use the latest recommended NTCIP standards at the time of bidding.

7.6 The controller shall have at least two communications ports that can be used for remote control. The controller shall accept commands via either port and respond via the same port that received the command, so that each port automatically functions as a backup communication link for the other port.

7.7 Where the PVMS will be connected to fiber optic communications, a stand-alone cabinet will be required for the Ethernet switch and fiber optic patch panel. This cabinet shall be connected to the sign controller via flexible conduit.

7.8 The controller communications shall include cell phone modems for U.S. Cellular, GPS and web server service.

7.8.1 One port shall be equipped with a cellular modem. This modem shall be a current model of SierraWireless modem which is at least equivalent to the GX450 modem and should be set to use the U.S. Cellular cell service. The antenna installation shall also include a GPS antenna connected directly to the cellular modem to be able to always locate the PVMS The Department will supply the SIM card for the modem. The cell modem shall be wired to be always ON; it will be necessary to pull a fuse or disconnect the power plug to re-cycle the power.

7.8.2 The other port shall be an RJ-45 Ethernet port, which may be used for a wireless data communication service. The Ethernet port shall also be suitable for connecting a notebook computer for local control and maintenance. It shall operate in accordance with the latest version of NTCIP 2104, Ethernet Subnetwork Profile. The medium shall be 10Base-T.

7.9 An antenna suitable for cellular telephone or data service shall be installed on top of the message board. Install the antenna in a way that does not permit water to enter the message board. A 50 ohm coaxial cable, 100 percent shielded and designed for outdoor use, shall run from the antenna to the controller compartment. The cable may not pass through the top of the compartment and the hole where the cable enters must be sealed watertight. Immediately upon entering the controller compartment, the cable shall terminate on a grounded lightning protector. The antenna shall be omnidirectional, for bandwidth that are compatible with the modem. It shall have a built-in ground plane and vertical polarization. The antenna gain shall be at least 5 dBi. The GPS antenna for the cellular modem may be included in this antenna.

7.10 Controller Standards

7.10.1 The sign shall support the following objects defined in NTCIP 1201, Global Object Definitions:

7.10.1.1 All objects in the Global Configuration Node.

7.10.1.2 The following objects in the Global Time Management Node: globalTime; globalDaylightSaving; maxTimeBaseScheduleEntries; timeBaseSchedule-Table; maxDayPlans; maxDayPlanEvents; timeBaseDayPlanTable.

7.10.1.3 All objects in the Report Parameters Node.

7.10.1.4 The module table required by Clause 2.2.3 of NTCIP 1201 shall contain at least one row with module Type equal to 3 (software).

7.11 Dynamic Message Sign Objects: See Appendix A for a list of the required sign objects.

7.12 Displaying a blank sign shall be achieved in the same way that any message is displayed (i.e., by using an object that has a syntax of either MessageActivationCode or MessageIDCode). However, a new memory type, dmsMessageMemoryType equal to 'blank (7)', shall be created to support this operation. It shall function as follows: The dmsMessageNumber for this memory type shall be reflective of the run time priority and shall be between 1 and 255, inclusive. The CRC for this memory type shall be 0x00 00 and the normal CRC algorithm shall not be applied to blank messages. The dmsMessageMultiString shall be an octet string of length 0. The activate priority for any MessageActivationCode using this type of memory shall be used as the actual activation priority.

7.13 The software shall implement the following tags (opening and closing where defined) of Mark Up Language for Transportation Information (MULTI) as defined in NTCIP 1203.

- Fields for 12 hour time, day of month, month, four digit year, and current speed in mph.
- Flash
- Font
- Justification Line
- Justification Page
- Moving Text
- New Line
- New Page
- Page Time

- Hexadecimal Character

7.14 All communication shall conform to the current NTCIP standard at time of writing.

8. REMOTE CONTROL SOFTWARE

8.1 The PVMS shall be compatible with the MaineDOT ATMS system known as New England Compass, developed by the Southwest Research Institute (SwRI). Remote monitoring and control of the PVMS shall be accomplished through Compass.

8.2 The Contractor shall supply any PVMS manufacturer-specific software that can provide more advanced tasks, such as diagnostic testing. This additional software shall either be web-based or the Contractor shall provide a minimum of ten (10) licensed copies of the software on computers as directed by the TMC. It is also to enable a maintenance technician at a sign (i.e. local) to exercise all sign features, examine event logs, and run diagnostic tests.

8.3 The PVMS control software is expected to be the VMS manufacturer's standard product, with minimal customization necessary to integrate with Compass. MaineDOT already has the software JamLogic integrated with Compass; therefore, if the manufacturer's software is JamLogic, the Contractor will need to integrate the new PVMS into the existing JamLogic application.

8.4 The software for use by maintenance technicians need not be identical to that used by the traffic management staff, although it must have equivalent capabilities.

8.5 The Contractor shall provide (and install as needed) a minimum of three licenses to the manufacturer's software for the PVMS sign controller. The installation shall occur at the MaineDOT Transportation Management Center (TMC) in Augusta, Maine.

8.6 The user shall enter commands by selecting from menus. The user shall make selections from menus and from lists of signs, messages, and options using a mouse. The interface shall be easy to use, minimizing memorization and opportunities for errors. The interface shall automatically check commands for out-of-range values and other errors. When it checks an error, it shall beep, reject the command or data, and provide the user with a clear explanation. The software shall have the complete text of the software operator's manual stored on a USB thumb drive or CD, readily available to the user.

8.7 The software shall be capable of remote communication with field equipment via IP addressing over a cellular or Ethernet network. It shall use the appropriate communication method for each sign, based on information stored in the computer's database.

8.8 Only users, who have proper authorization, as indicated by their passwords, shall be able to undertake the following actions:

- Place equipment on standby.

- Change sign messages, blank signs, and change message priority.
- Replace or delete messages stored in a DMS controller's memory.
- Display test patterns on a sign.
- Change or delete the sign computer's schedule.
- Modify the message library on the sign computer's hard disk.
- Change sign configuration parameters.
- Delete the event log.
- View passwords (restricted to Administrator authorization).
- Change passwords and privileges (restricted to Administrator authorization).
- Each user shall have a different password. Users may be granted or denied permission to use each protected command independently. Via an encrypted lookup table, the computer shall determine which of the protected commands a user may use.
- The software shall ask the user for his password at the time the protected command is entered. The computer shall not carry out these commands unless the user has the proper privileges

8.9 A user shall be able to take a sign off line, causing it to be ignored by the sign computer. This will be used when a malfunctioning sign is generating an excessive number of alarms. When a user attempts to control an off line sign, a message shall appear on his screen informing him that the sign is out of service. When a user takes a sign off line, the software shall ask the user to type in a comment of up to 100 characters explaining the action. The comment field may be left blank. The computer shall also record the user's name, based on his password, and include the name and comment in the failure report described below.

8.10 The sign computer shall store a library of at least 999 messages on its hard disk. In addition to the message text, the file shall contain all the MULTI control codes needed for a sign to properly display the message.

8.11 When adding a message to the library, a user shall specify the message name. If a message with the same name already exists in the library, the software shall notify the user and give him the options of replacing the existing file or selecting a new name for the message he has just created. A user shall also be able to delete library messages from within the program. The program shall ask the user to confirm each message deletion before actually deleting the file.

8.12 If the user is seeking a message to display, the software shall present a list so that the user can choose one. When the user makes his selection, the software shall display the entire message, exactly as it would appear on a sign, and shall ask the user to confirm that this is the message desired. The user shall then be able to post the message on one or more signs, edit the message, or do nothing with it.

8.13 Upon creating or revising a message, the user shall be able to save it in the message library on the sign computer's hard disk or send it directly to one or more DMS controllers for storage or display.

8.14 When a user sends a message to one or more signs, the sign computer shall automatically check to be sure that the message will fit on the sign. This checking shall take into account the selected fonts and the size of the sign's display. If the message won't fit, the computer shall alert the user and not post the message.

8.15 If a user chooses to send the same message to multiple signs, the software shall present the user with a list of all signs, so that the user can check off which signs the new message goes to. The screen shall also give the user a choice of "All Signs". The list shall identify signs by roadway and milepost. Using a single command, the user shall be able to cause the message to be stored in all the signs he specified, replacing those previously stored in the controllers. Similarly, the user shall be able to use a single command to have all the selected signs display the same message, or the same message number.

8.16 In addition to entering commands for immediate execution, a user may store commands in the sign computer for future execution at a given time. A user shall be able to quickly and easily create, modify, suspend, or cancel a schedule of commands for the sign computer to issue to specified DMS controllers. The user shall be able to specify the same action at the same time for multiple signs, in the same way as was described in the preceding paragraph. A user shall also be able to schedule the printing of sign-related reports. A user shall not be able to schedule any command that he does not have the privilege to execute directly. The schedule shall show the name of the user who scheduled each command, based on his password. Actions that would be recorded in the event log if a user commanded them directly shall also be logged when they result from a scheduled command. The record shall include the user's name and an indication that the command was scheduled.

8.17 The software shall provide a single command that not only transmits a message to a sign (after confirming that it fits) but also causes the sign to immediately display that message on the sign (after confirming that the transmission was error free).

8.18 The software shall display messages as a matrix of dots that replicate the way the message will actually appear on a selected sign. The presentation should be based on the assigned font and the height and width (in pixels) of the display, as stored in a data base maintained by the sign computer. This type of display will be used during message creation and editing, as well as when displaying to a user the message currently on a sign. If the user is displaying a message from the library or creating a message without specifying what sign it will go on, the display shall be based on the characteristics of the signs provided in this project.

8.19 The sign computer shall maintain an event log file on its hard disk with a record for each appearance or disappearance of an alarm from a sign. The record shall include the date, time, sign ID, and nature of the change. If the alarm

indicates a change in the sign display, the log shall include the exact text of the message, the device from which it was commanded, and, if commanded via the sign computer, the name of the person posting the message, based on his password. The log file shall include this same information each time a message is downloaded to a sign's memory from the sign computer.

The log shall also record each time a user at the sign computer does the following:

- Changes the priority of a message.
- Changes the schedule.
- Changes a message in the library on the computer's hard disk.
- Each log record shall include the user's name based on his password.
- Each log record shall record the beginning and end of communication failures. The sign computer shall deem a communication failure to have occurred if it does not get an error-free response to two consecutive commands to a controller. The computer shall deem a controller recovered if it responds properly to a command.

8.20 The system shall provide the following report types to the user's screen, a disk file named by the user, or to the printer, as specified by the user:

8.20.1 *Equipment Failure:* Lists each sign that is currently malfunctioning, along with the time and date of failure and a phrase indicating the nature of the problem. Also lists each DMS controller that is off line, along with the date and time it was taken off line, the comment written by the user who took it off line, and the user's name based on his password.

8.20.2 *Sign System Configuration*: Lists the current values of all configuration parameters stored in the sign computer, clearly labeled. It includes such things as communication address. It does not include operating parameters stored in the DMS controllers.

8.20.3 *Individual Sign Configuration:* Lists the current values of all changeable parameters stored in a DMS controller, clearly labeled. It includes such things as temperature thresholds. This report shall cover all signs, or a particular sign, as specified by the user. The information displayed shall be uploaded from the DMS controllers at the time the report is requested. If the sign computer is unable to upload the data from a particular sign, it shall use the corresponding data on its hard disk, but shall indicate in the report that the data is from the hard disk and may not be current.

8.20.4 *Current Sign Status:* Lists sign location, text of message currently displayed, the priority value of the message, storage location of the message in the sign's memory, entity that caused the message to be

displayed, and controller status (failed, working, or off line) for each sign in the system. This report shall cover all signs, or a particular sign, as specified by the user.

8.20.5 *Event Log:* Lists all information in the control computer's event log file, with each field clearly labeled. The user shall be able to specify that only events between certain times, or pertaining to a certain sign, or pertaining to a certain type of event, or any combination of the foregoing, shall be included in the report. Events shall be listed chronologically.

8.20.6 *Message Library:* Lists the text of each frame of each message in the message library, along with the duration for which the frame is displayed. Also lists the message's file name and latest revision date. Each frame shall be displayed in the report in the same way it would appear on a sign, with regard to text centering, bolding, and justification. Flashing text shall be underlined. Messages shall be grouped by subdirectory, and a user shall be able to specify that only certain subdirectories be included.

8.20.7 *Sign Computer's Schedule:* Lists all information in the sign computer's schedule, clearly labeled. The user shall be able to specify that only events between certain times, or pertaining to a certain sign, or pertaining to a certain type of event, or any combination of the foregoing, shall be included in the report. Events shall be listed chronologically.

8.20.8 *Sign Memory:* Lists sign ID and location and the text of each message stored in the sign. The message portion of the report shall indicate the message's memory location number and shall display the text of each frame of the message, along with the duration for which the frame is displayed. Each frame shall be displayed in the report in the same way it would appear on a sign, with regard to text centering, bolding, and justification. Flashing text shall be underlined. All information shall be clearly labeled. The user shall be able to specify that the report cover only a particular sign, or all signs. The information displayed shall be uploaded from the DMS controllers at the time the report is requested. If the sign computer is unable to upload the data from a particular sign, it shall use the corresponding data on its hard disk, but shall indicate in the report that the data is from the hard disk and may not be current.

8.20.9 *Bad Pixel Maps:* Consist of a matrix display indicating which display elements of a sign have failed, according to the DMS controller. The user shall be able to specify that the report cover only a particular sign or all signs with display problems. If the user specifies all signs with display problems, the report will cover all signs whose controllers are currently reporting malfunctioning drivers or display elements.

8.20.10 The time and date for which the information is current shall appear on every page of each printed report. All pages shall be numbered.

9. TESTING

9.1 The manufacturer shall test the signs using the manufacturer software through Compass. The manufacturer shall follow the manufacturer's recommended commissioning procedures and/or the MaineDOT testing procedures at the direction of the Resident.

9.2 Prior to the testing, the Contractor shall successfully install the new PVMS in their permanent locations and integrate the new PVMS into Compass.

9.3 The Contractor is strongly encouraged to pre-test the PVMS using the manufacturer's software. When the Contractor is confident that the signs will pass the required testing, the Contractor shall coordinate with the Resident and arrange for the Department's representatives to witness the testing.

9.3.1 The Contractor shall contact the Resident at least two weeks in advance of the proposed testing date and shall arrange for testing to begin at a mutually convenient time.

9.3.2 All PVMS testing shall be done on the same day (or across two days, if necessary) on-site with the PVMS. The manufacturer shall provide all materials and equipment needed for testing and shall prepare a written report of the test results.

9.4 The test procedure shall be designed to uncover manufacturing defects and shipping damage of all types. The test shall include a visual inspection of the sign. Among the aspects that must be tested are the following:

- All diagnostic routines provided by the manufacturer.
- Proper operation of every pixel, including uniform color, uniform brightness at all brightness levels and proper current consumption.
- Proper wiring of the display modules checked by displaying a text message that identifies the modules' proper row and column positions.
- Appropriate display brightness for day and night conditions, and brightness when the sun at its worst condition for the location.
- Proper aiming of the display modules.
- Proper entry of messages into memory.
- Proper operation of sign monitoring.
- Proper operation of sensors for alarm conditions.
- Correct wiring of sensors and alarms to the controller's inputs.
- Proper remote access and control using the central and laptop software provided in this project.

9.5 Software Test: The purpose of the sign computer software test is to demonstrate that the software operates reliably and is in full compliance with the specifications. The manufacturer shall conduct the tests following the approved test plan but, if practical, shall also perform any supplemental tests requested by the Department's representatives at the time of testing. To be accepted, the software must pass all the tests.

9.6 The test plans shall document the test procedures to test every interface, feature, and function of the software and hardware, including features present but not required by these specifications. The testing shall demonstrate that the software deals appropriately with communication errors and operator errors. The testing shall confirm that the signs can be monitored and controlled from each of the Department's computers on which software was installed.

9.7 Spare parts shall also be tested by substituting them into a working sign and running specific tests related to that hardware.

10. TRAINING

10.1 Within two weeks of successful completion of testing, the manufacturer shall train the Department's operations and maintenance staff at the PVMS connected to the fiber optic backhaul.

10.2 In the training, each trainee shall receive hard copies of the appropriate manuals. The training shall be conducted in such a way as to familiarize the trainees with the manuals (and any other handouts provided) so that the trainees are able to make efficient use of those materials after the training. One copy of all course material, in reproducible form, shall be delivered to the Resident immediately following course completion.

10.3 The manufacturer shall provide all tools and instruments needed for the training. The training should be designed to last between four and six hours, depending on trainee interaction.

10.4 The training program shall be "hands on" training using the PVMS connected to the fiber optic backhaul installed in this project. That training shall include use of the control panels (if provided), control of the signs using the Department's notebook computers, display module replacement, controller replacement, battery replacement, and troubleshooting. Spare parts furnished under this contract may be used for the replacement activities. Each trainee shall use the Department's laptop software to run all the diagnostic messages, create a message, schedule the message, and adjust the sign's brightness. Each trainee shall use the sign controller's front panel to run stored messages and determine the sign's current status.

10.5 The training should also cover the following topics:

10.5.1 Proper towing and positioning of the sign, leveling, removing the tongue, raising and lowering the message board, aiming the message board and aiming the solar panels; and

10.5.2 Field adjustments, parts replacement, preventative maintenance procedures and troubleshooting.

11. SUPPORT

11.1 The Contractor shall provide technical support throughout installation and for one year following project acceptance. Phone numbers provided for technical support must be attended by a person who can answer questions or promptly find the answer to questions. An answering machine or answering service does not constitute technical support. The telephone support required by these specifications shall be provided at least eight hours a day (Eastern Standard Time) on all work days.

11.2 The manufacturer shall have a representative present when the contractor installs the first sign. The representative shall observe the installation, provide additional training to the contractor as required, and ensure that the sign is installed correctly. If the manufacturer's representative is not confident that the contractor can install the remaining signs without assistance, the representative shall immediately notify the Engineer.

12. SPARE PARTS

12.1 Spare Parts Vendor shall provide the following spare parts for each shipment of signs

- Display modules: provide 20 percent of the total modules as spare parts.
- Controllers: provide two.
- Display power supplies: provide 10 percent of total provided, minimum of one.
- Other circuit boards and modules used in the sign, if not covered by the previous items: provide one of each type.
- Surge protectors: provide two of each type.
- Battery charging unit: provide two.

13. WORK ZONE MONITORING SYSTEM

13.1 Public Information is part of the FHWA Work Zone monitoring. The following features may be required:

- Automated traffic flow monitoring system
- Data collection devices
- Communication charges
- Setup, Installation ,Testing, and Maintenance of some or all devices
- Automatic message update on these signs and/or other PVMS owned by the Department (NTCIP Level 1 protocol) as defined by the Department

- Access to detail data for current and historical traffic flows
- Initial and ongoing Monthly pricing (projects can exceed 12 months)

14. WARRANTY

14.1 The contractor shall provide a minimum of one year parts and labor warranty support. Warranty shall begin on the date of final equipment acceptance.

METHOD OF MEASUREMENT: Semi-Permanent Pad-Mounted VMS shall be measured by each unit installed, connected, tested and accepted in place.

BASIS OF PAYMENT: The accepted quantities of Semi-Permanent Pad-Mounted VMS will be paid for at the contract unit price each, complete in place. Payment shall be full compensation for the VMS, installation, communications and testing.

Payment will be made under:

Pay Item		Pay Unit
654.223	Semi-Permanent Pad Mounted VMS	Each

Appendix A

Required Dynamic Message Sign Objects

The proposed PVMS shall include the following objects, as defined in NTCIP 1203

- Sign Configuration and Capability Objects
  - dmsSignAccess
  - dmsSignType
  - dmsSignHeight
  - dmsSignWidth
  - dmsSignTechnology
  - vmsCharacterHeightPixels
  - vmsCharacterWidthPixels
  - vmsSignHeightPixels
  - vmsSignWidthPixels
  - vmsHorizontalPitch
  - vmsVerticalPitch
  - vmsMaxNumberPages
  - vmsMaxMultiStringLength
- Font Objects
  - numFonts
  - fontTable and subsidiary objects
  - maxFontCharacters
  - characterTable and subsidiary objects
  - fontMaxCharacterSize
- MULTI Configuration Objects
  - defaultFlashOn
  - defaultFlashOff
  - defaultFont
  - defaultJustificationLine
  - defaultJustificationPage
  - defaultPageOnTime
  - defaultPageOffTime
  - defaultCharacterSet
  - dmsColorScheme
  - dmsSupportedMultiTags
- Message Objects

- messageIDCode
- messageActivationCode
- dmsNumPermanentMsg
- dmsNumChangeableMsg
- dmsMaxChangeableMsg
- dmsFreeChangeableMemory
- dmsNumVolatileMsg
- dmsMaxVolatileMsg
- dmsFreeVolatileMemory
- dmsMessageTable and subsidiary objects
- dmsValidateMessageError

♦ Sign Control Objects

- dmsControlMode
- dmsSWReset
- dmsActivateMessage
- dmsMessageTimeRemaining
- dmsMsgTableSource
- dmsMsgRequesterID
- dmsMsgSourceMode
- dmsShortPowerRecoveryMessage
- dmsLongPowerRecoveryMessage
- dmsShortPowerLossTime
- dmsResetMessage
- dmsCommunicationLossMessage
- dmsTimeCommLoss
- dmsPowerLossMessage
- dmsEdDurationMessage
- dmsActivateMsgError
- dmsMultiSyntaxError
- dmsMultiSyntaxErrorPosition
- dmsMultiOtherErrorDescription
- dmsActivateMessageState

♦ Brightness Objects

- dmsIllumControl
- dmsIllumMaxPhotocellLevel
- dmsIllumPhotocellLevelStatus
- dmsIllumManLevel

- dmsIllumBrightnessValues
- dmsIllumBrightnessValuesError
- dmsIllumLightOutputStatus

- Scheduling Action Objects
  - numActionTableEntries
  - dmsActionTable and subsidiary objects
- Sign Status Objects, to the extent supported by the sign hardware.
  - statMultiFieldRows
  - statMultiFieldTable and subsidiary objects
  - watchdogFailureCount
  - dmsStatDoorOpen
  - shortErrorStatus
  - controllerErrorStatus
  - dmsPowerStatusMap
  - dmsPowerNumRows
  - dmsPowerStatusTable and subsidiary objects
  - fanFailures
  - pixelFailureTableNumRows
  - pixelFailureTable and subsidiary objects
  - pixelTestActivation
  - dmsPixelStatusTable and subsidiary objects
  - dmsPixelFailureTestRows
  - dmsPixelFailuresMessageRows
  - dmsLightSensorStatusMap
  - dmsLightSensorNumRows
  - dmsLightSensorStatusTable and subsidiary objects
  - dmsTepSensorStatusMap
  - dmsTemSensorNumRows
  - dmsTempSensorStatusTable and subsidiary objects
  - powerSource
  - tempMinAmbient
  - temptMaxAmbient
  - tempMinSignHousing
  - tempMaxSignHousing
  - tempSensorWarningMap
  - tempSensorCriticalTempMap
- Graphic Definition Objects

- dmsGraphicMaxEntries
- dmsGraphicNumEntries
- dmsGraphicVertSpacing
- dmsGraphicHorzSpacing
- dmsGraphicMaxSize
- availableGraphicMemory
- dmsGraphicBlockSize
- dmsGraphicTable and subsidiary Objects
- dmsGraphicsBitmapTable and subsidiary objects

Any mandatory objects that are required by NTCIP1203 but that are missing from the above list shall also be supported.

Object Range Requirements Every object required by these specifications shall have full standardized object range support except:

OBJECT	MINIMUM PROJECT REQUIREMENTS
Max Time Base Schedule Entries	28
Max Day Plans	14
Max Day Plan Events	12
Max Event Log Configurations	50
Event Configuration Mode	2, 3, and 4
Max Event Log Size	200
Max Event Classes	16
Max Group Address	1
Number Fonts	4
Max. Font Characters	100
Number Action Table Entries	Equal to message capacity of sign
Number of User-Define Events	0
Number of External Devices	0
Number of Brightness Levels	16 or more

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS
(Road Weather Information Station (RWIS) System Equipment)

654.53 Road Weather Information Station: This work shall consist of furnishing, installing, integrating and testing a solar powered Road Weather Information Station (RWIS) system. This RWIS system shall include a new steel pole with multiple weather sensors mounted to a reinforced concrete foundation.

This work also includes integrating the data obtained by the RWIS system into the Maine Department of Transportation (MaineDOT) Advanced Transportation Management System (ATMS), New England Compass ATMS (Compass ATMS). Compass was developed by the Southwest Research Institute (SwRI) and is used by Maine, New Hampshire, and Vermont. This integration effort shall include the development of a live, supported dataflow using an open vendor API from the RWIS System Equipment to Compass ATMS and MaineDOT. RWIS data shall also be integrated into MaineDOT's existing Road and Weather software as part of this project.

MaineDOT currently maintains RWIS systems manufactured by Vaisala and Campbell Scientific. Both of these vendor's RWIS systems are currently integrated into both Compass and the existing Road and Weather software.

The Contractor shall provide a qualified System Integrator to integrate the RWIS system data into Compass. The System Integrator shall be responsible for the full integration and function of new RWIS data in Compass. Integration into MaineDOT's Road and Weather software shall be the responsibility of the Contractor and can be done separately of the Compass integration. MaineDOT has an existing contract for the Road and Weather software and will pay any associated licensing fees after the initial six months.

654.021 General: The following specifications detail a typical RWIS system as currently deployed in the State of Maine. If any of the following hardware-specific requirements listed in the following sections cannot be met by a willing Bidder, but the Contractor believes that strict conformance to the given requirement is unnecessary or may be accomplished differently, the Contractor shall provide a list of the requirements that cannot be strictly met along with a justification for how the Contractor's proposed RWIS System Equipment may be considered functionally equivalent in accordance with Special Provision 103.

654.026 RWIS System Equipment – General

1. All software and data interfaces shall be designed to reflect the latest NTCIP and Traffic Management Data Dictionary Standards. Specifically, the system shall support NTCIP 1204 v03.08 protocol.

2. The RWIS System shall include a controller (controller or Data Logger) that shall satisfy the following requirements:

    a. The controller shall have a modern processor, manufactured within the previous 12 months.
    b. The controller shall have a minimum of 512MB DDR3 and 2GB of NAND flash memory.
    c. The controller shall have internal/integral Ethernet communications and support direct Ethernet connections.
    d. The controller shall provide a means for real-time clock synchronization and location definition at least once daily.
    e. The controller shall have remote access capability for local maintenance purposes (WLAN, WiFi, Bluetooth or equivalent).
    f. The controller shall keep records and show calibration history of the attached sensors.
    g. The controller shall operate in the temperature range of -34°F to +150°F.

3. The RWIS System Equipment shall include a Sensor Interface and Power Management system that shall satisfy the following requirements:

    a. All sensor connectors shall be MIL-SPEC circular connectors rated to IP66/IP68.
    b. The controller shall include Ethernet interfaces for sensor and peripheral connections including at least two spare ports.
    c. Ethernet connections shall support Power over Ethernet (PoE) functionality.
    d. The controller shall have serial interfaces for sensor and peripheral connections without extension modules including at least two spare ports.
    e. The controller shall have centralized bus-bar for sensor grounding. The bus-bar shall be copper.
    f. Sensor cables shall be connected to bus-bar for grounding.
    g. The controller shall have built-in surge arrestors that shall be field replaceable.
    h. Where indicated on the Plans, the controller shall have the capability to operate with solar power technology (direct current).
    i. Where indicated on the Plans, the controller shall have a battery charger.

4. The RWIS System shall include a Power Supply that shall satisfy the following basic requirements:

    a. Where public utility power is provided, the Power Supply shall withstand an alternating current (AC) range of 89VAC to 135VAC
    b. Power shall have in-built surge protection against transients.
    c. Power shall be at least 240W to ensure sensor heating under all conditions.
    d. Power supply shall have stable output of ±1 percent.
    e. Power supply shall allow parallel connection when additional power is required.

5. The AC Supply shall satisfy the following requirements:

a. The controller AC supply shall have surge protection level at least 6kV/3kA. Surge protection units shall be field replaceable.
b. AC Supply shall include a main disconnect circuit breaker for maintenance purposes.
c. Where AC power systems are employed, the RWIS System shall include a Battery Back-Up that shall satisfy the following requirements:
    i. The battery back-up system shall provide sufficient power for all RWIS system components for a minimum of 24 hours at full function in the absence of AC power.
    ii. At the end of the initial 24 hours without AC power, the battery back-up system shall provide sufficient power for critical sensors (as defined by the manufacturer) for an additional 24 hours. This low power or survival mode may include less frequent polling of the sensor data but not less than once every ten (10) minutes.
    iii. At the end of 48 hours without AC power, the battery back-up system shall not have discharged more than 50 percent of the rated capacity of the battery back-up system.
    iv. Back-up batteries shall be sealed and spill proof and shall be considered maintenance-free.
    v. The battery back-up system shall be Ethernet ready. The Contractor shall furnish and install an Ethernet patch cord to connect the battery-back-up system to the Ethernet switch in the controller cabinet.
    vi. The Contractor shall submit for approval a Technical Submittal calculation for the battery back-up system that demonstrates compliance with the required hold-up time of the back-up system. This calculation shall include the manufacturer's specified loads for each sensor, the controller, and other pieces of equipment to be powered during the full function period and the low power/survival mode period. The battery calculation shall be measured from 0°F. The Technical Submittal shall be submitted in accordance with Special Provision 654.

6. Where solar power systems are employed, the RWIS System shall include the following solar power components:

    a. Solar Power Autonomy
        i. The solar panels, in combination with the batteries, shall provide four (4) days, minimum, autonomy under no-light conditions when the batteries are fully charged and to provide 24 hours per day, 7 days per week, 365 days per year operation with no loss of operations.
        ii. The batteries shall provide sufficient power to maintain the RWIS system full functionality for the four days.
        iii. At the end of four days, the system shall be capable of maintaining power to the critical sensors (as defined by the manufacturer) for up to 24 additional hours. The system shall be capable of switching to low power/survival mode automatically as well as manually through remote commands.

iv. At the end of the initial four days on continuous, full function operation under no-light conditions, the batteries shall still retain at least 50 percent of their full design capacity at 0°F.
v. The solar panels shall be sufficient to recharge the batteries from 50 percent to 100 percent of rated capacity under full RWIS system load within 48 hours.
vi. Batteries - The batteries shall meet the requirements of the AC Battery Back-up system as defined above.

b. Photovoltaic (PV) panels with mounting brackets
   i. The solar panel array shall be made up of one or more PV panels along with support and mounting brackets to attach firmly and securely to a steel support pole.
   ii. The mounting bracket shall provide flexibility to aim the solar panel to maximize sun exposure.
   iii. The solar panel array shall be designed to operate over a free air temperature range of -30°F to +122°F.
   iv. The solar power array shall be Underwriter's Laboratory (UL) approved. UL certification shall be provided with the Technical Submittal.

c. The equipment cabinet shall include a manual generator transfer switch to allow the cabinet to be switched from solar power to provide 120 VAC generator power. The generator will be provided by MaineDOT as required. The generator transfer switch shall be mounted through the cabinet wall facing away from or downstream of the direction of traffic.

d. Control Devices
   i. Control devices should include a solar controller and a battery charge controller, with all necessary connector cables and ancillary equipment.
   ii. The control devices shall prevent the batteries from overcharging.
   iii. The control devices shall include low voltage disconnect devices which disconnect the batteries to prevent damage in the event of a very low state of charge.
   iv. If the control devices include a power inverter, the power inverter shall provide 120 VAC power to the controller with three (3) percent or less total harmonic distortion and five (5) percent +/- output voltage regulation.
   v. The control devices shall be temperature compensated such that the battery charging voltage is automatically adjusted based on temperature variations to maximize battery life.
   vi. The control devices shall include a system monitoring device which allows maintenance personnel to assess critical system parameters such as battery condition and solar panel output.
   vii. The control devices shall include overcurrent protection to ensure safe power output in the event of a malfunction of the solar power system.

e. Solar Power Technical Submittal
   i. The solar power Technical Submittal shall include all components of the solar power system including catalog cuts and shop drawings for the solar panels, the batteries, the charging system and inverters (as required), solar panel mounting hardware, supplemental battery cabinets, and all other equipment

and hardware for a fully functional solar power system. The Technical Submittal shall be submitted in accordance with Special Provision 654.

ii. The Contractor shall submit for approval a solar calculation which demonstrates compliance with the power requirements. This calculation shall include the manufacturer's specified loads for each sensor, the controller, and other pieces of equipment to be powered. The solar calculation shall be measured from 0°F during lowest solar exposure weeks (late December/early January).

iii. The Technical Submittal shall include shop drawings and calculations for the solar panel support pole(s) and foundation(s).

iv. The Technical Submittal shall indicate the power requirement for the sensors indicated to be functional under the low power/survival mode.

7. The RWIS System Equipment shall include a fiber optic communications system that shall satisfy the following requirements:

   a. The controller shall support at least two parallel communication lines out from the station, with one communication line being a cellular modem.
   b. The controller shall be native Ethernet, allowing Ethernet communications via cellular modem or fiber optic Ethernet switch.
   c. The controller cellular communication shall support modern networks: 3G/4G/LTE.
   d. The controller cellular communication shall support dual SIM usage for data transmission purposes.
   e. The controller shall support an RJ-45 port.
   f. Where the controller includes a WLAN for local remote access, the controller shall have user definable time-out for WLAN broadcasting to prevent unintentional use of WLAN.
      i. The controller WLAN shall have the ability to be used as a hotspot.
      ii. The controller WLAN shall have the ability to be used as a client.
   g. The controller shall have two Ethernet networks: one for internal communications and second for external communications.
   h. The controller's internal network shall be Ethernet based.
   i. The controller shall be connected to the Ethernet switch via Ethernet patch cord furnished and installed by the Contractor.

8. The controller shall include a cabinet enclosure that shall satisfy the following requirements:

   a. The controller enclosure shall not have external connectors for sensors and other equipment, which may cause excessive amount of corrosion and malfunctions.
   b. All entries to the controller enclosure shall be completely encased in conduit with appropriate bushings to prevent insect and moisture entry. The sensor cable inlets shall be vandal-proof.
   c. The controller enclosure material shall be made of bare aluminum or stainless steel.

d. The controller enclosure shall be equal to IP66 or NEMA-equivalent rating.
e. The controller enclosure door shall have wind lock mechanism to maintain the door in an open position during maintenance.
f. The controller enclosure shall include a fiber optic Ethernet switch matching the requirements of Item 654.311 Ethernet Switch with Fiber Optic Interfaces except that the switch may be shelf or wall-mounted.
g. The controller enclosure shall include a fiber optic patch panel matching the requirements of Item 654.3331 Fiber Optic Patch Panel with 12 positions, except that the patch panel may be shelf or wall-mounted.

654.027 RWIS System Sensors: The Contractor shall furnish, install, integrate and test environmental and weather sensors that shall measure several environmental characteristics. The following sensor equipment shall be included:

- Wind Speed and Direction Sensor
- Present Weather Detector (may include visibility, precipitation and accumulation sensors if the single sensor can meet the functional requirements)
- Air Temperature and Humidity Sensor
- Barometric Pressure Sensor
- Road Surface Sensors (Non-Invasive and Subsurface Probe)

1. Wind Speed and Direction Sensor
    a. The sensor shall measure both wind speed and wind direction.
    b. The sensor shall be weather resistant and have an operational temperature of -40°F to +140°F.
    c. The sensor shall fully compensate for the effect of temperature, humidity and pressure.
    d. Measurement Parameters:
        i. The wind speed sensor shall have a measurement range of 0 to 150 miles per hour (mph).
        ii. Wind speed shall be user selectable in units of miles per hour (mph) and meters per second (mps).
        iii. Wind speed resolution shall be to the whole integer for the selected unit (i.e. 5 mph or 3 mps) and accuracy shall be within one (1) percent of actual.
        iv. Wind direction shall be measured in degrees. Wind direction resolution shall be +/- 3 degrees.
        v. Wind speed and direction shall be reported as instantaneous value and rolling average value to a customized average time.
        vi. Wind speed and direction minimum and maximum values shall be available over a customized time period (i.e. 10 minutes).
        vii. Wind speed shall be available as 3-second gust values.

2. Visibility Sensor (or visibility function of Present Weather Sensor)

a. The visibility sensor may be integrated into a single sensor unit that operates as a Present Weather Detector. If they are separate units, the visibility sensor shall meet the requirements of parts b. through g. below.
b. The sensor shall have a measurement range of up to 10 miles with an accuracy of +/- 10 percent.
c. The sensor shall utilize back scatter optical technology.
d. The sensor shall have an operational temperature range of -40°F to +131°F.
e. The sensor shall have an operating humidity range of 0-100 percent relative humidity.
f. The sensor shall be IP66 rated.
g. The sensor shall be capable of detection through the following weather conditions:
    1. Clear visibility
    2. Fog
    3. Mist
    4. Haze (from smoke or other particulates)
    5. Rain
    6. Freezing rain
    7. Snow

3. Precipitation and Accumulation Detector (or precipitation function of Present Weather Sensor)
    a. The precipitation detector may be integrated into a single sensor unit that operates as a Present Weather Detector or may be provided as independent sensors.
    b. The precipitation sensor shall meet the requirements of c. below, regardless whether it is part of a Present Weather Sensor or if it is a stand-alone sensor.
    c. Measurement Parameters:
        i. The sensor shall detect the following types of precipitation:
            1. Rain
            2. Freezing Rain
            3. Drizzle
            4. Freezing Drizzle
            5. Mixed Rain/Snow
            6. Snow
            7. Sleet/Ice Pellets
        ii. The sensor shall be capable of measuring rain precipitation accumulation rate to an accuracy of 0.05 inches per hour measured over a 10 minute time period.
        iii. The sensor shall be capable of measuring snow accumulation and amount of new snow since previous readings. Snow accumulation sensitivity shall be at least 0.5 inches per hour with an accuracy of +/- 10 percent.

4. Air Temperature and Humidity Sensor
    a. The sensor shall contain a radiation shield to protect the sensor from solar radiation influence and from precipitation. The radiation shield shall contain no moving parts.
    b. The sensor shall combine air temperature detector (AT), relative humidity detector (RH), and dew point detector (DP) into a single unit. Alternatively, dew point may be calculated by the controller or via the Road and Weather software.
    c. The sensor shall have integral surge protection.
    d. The sensor shall be IP66 rated.
    e. The AT detector shall have an operational range of -40°F to +140°F.
    f. The RH detector shall have an operational range of 0-100 percent RH.
    g. Measurement Parameters:
        i. AT detector shall provide instantaneous and rolling one minute average values. The AT detector shall hold the previous five observations.
        ii. AT detector shall have rolling 24-hour minimum and maximum temperature values.
        iii. AT detector shall have an accuracy of 0.5°F over the range of 0°F to +100°F.
        iv. RH detector shall provide rolling one minute average values from the previous six observations.
        v. RH detector shall have an accuracy of two (2) percent and shall be reported to the nearest 0.1 percent (i.e. 90.8%).
        vi. RH detectors shall provide a means (either directly or via software) to measure dew point temperature and frost point temperature.
        vii. RH detector shall provide active measurements that maintain accuracy within 2% in condensing conditions.

5. Barometric Pressure Sensor
    a. The sensor shall be a silicon capacitive absolute pressure sensor designed for barometric pressure measurement.
    b. Measurement Parameters:
        i. The barometric pressure sensor shall conduct readings every 5 seconds and report the instantaneous readings.
        ii. The barometric pressure sensor shall measure in units of inches of mercury (Hg).
        iii. The barometric pressure sensor shall have an operational range of 18.0-31.0 inches Hg with a resolution of 0.03 inches Hg.
        iv. The barometric pressure sensor shall have an accuracy of +/- 0.12 inches Hg over the temperature range of 0°F to +140°F.

6. Non-Invasive Pavement Sensors
    a. There shall be sensors that can measure the pavement surface temperature, ambient air temperature, relative humidity, pavement surface state, and

friction coefficient remotely, without penetrating the roadway. The non-invasive sensors shall be Luft NIRS, Viasala DSC/DST, or equivalent.

b. If a pavement sensor cannot meet the accuracy requirements for all of the measurements in part a., additional supplemental sensors shall be furnished and installed to meet the accuracy requirements.
c. These non-invasive sensors shall have no moving parts.
d. Non-invasive sensors shall collect data samples from the road surface in accordance with the performance standards established in this specification.
e. The data generated by the non-invasive sensors shall be compatible with the current Road and Weather software currently in operation within the MaineDOT license for New England Compass ATMS.
f. Measurement Parameters:
    i. The pavement surface state sensor shall have an operational range of -40°F to +140°F and 0-100 percent RH.
    ii. The pavement surface state sensor shall be capable of remote readings at the range of 6.5 feet to 48 feet.
    iii. The pavement surface state sensor shall identify the condition of the pavement remotely with the following surface states:
        1. Dry
        2. Moist
        3. Wet
        4. Snow/Frost
        5. Ice
        6. Slush
    iv. The pavement surface state sensor shall measure the depth of precipitation on the pavement surface as shown below, all at a resolution of 0.01 millimeters:
        1. Water/Rain at 0.0 - 2.0 millimeters
        2. Ice at 0.0 – 2.0 millimeters
        3. Snow at 0.0 to 10.0 millimeters
    v. The pavement surface temperature sensor shall measure the pavement surface temperature every 60 seconds and have a resolution of 0.5°F.
    vi. The pavement surface friction sensor shall estimate the friction coefficient (grip factor) at the range 0.01 to 1.00 at a resolution of 0.01 units.

7. Subsurface Pavement Sensor
    a. The sensor shall be a probe specifically designed for outdoor use and deployment within the pavement structure.
    b. The sensor shall measure the surface temperature, surface moisture, and estimate road weather condition as:
        i. Dry
        ii. Damp
        iii. Wet

iv. Freezing & Wet
v. Icy
vi. Snowy

c. The sensor probe shall be water-tight and weather-resistant.
d. The sensor probe shall have an operational range of -40°F to +140°F.
e. Measurement Parameters:
    i. Road surface temperature shall have an accuracy of +/- 1°F with a resolution of 0.5°F.
    ii. Freezing point shall have an accuracy of +//- 1°F.

654.028 Closed Circuit Television (CCTV) Camera System: The Contractor shall furnish, install, integrate and test a digital closed circuit television (CCTV) camera at the RWIS System location that shall provide streaming video adjacent to the RWIS system. The CCTV camera shall be connected to the controller and shall be remotely controlled via the RWIS communication system.

1. The CCTV camera shall be digital, IP addressable and Ethernet ready.
2. The CCTV camera shall be Underwriter's Laboratory (UL) approved. The UL certification shall be provided with the technical submittal.
3. The CCTV shall have the capability to be viewed, controlled and tested locally at the controller utilizing a laptop computer with the manufacturer's software. This shall include the capability to locally retrieve operational status and fault data for the camera.
4. The CCTV shall have a minimum resolution of HDTV 800 x 600.
5. The CCTV shall be capable of streaming video with H.264 and/or Motion JPEG video compression format.
6. The CCTV shall be capable of time triggered FTP.
7. The CCTV shall be powered by an industrial grade Power Over Ethernet Injector (POEI). The POEI shall provide operating power and Ethernet data to the CCTV.
8. The CCTV shall be housed in an environmentally hardened enclosure suitable for continuous outdoor use. The CCTV shall have an operating range of -40°F to +100°F, minimum.
9. The CCTV housing shall be IP66-rated.

654.029 RWIS System Support Structure and Foundation: The Contractor shall furnish and install a galvanized steel support structure on a steel reinforced concrete foundation.

1. The steel support structure shall be designed by the Contractor. Shop drawings and structural calculations shall be submitted to the Engineer for approval prior to beginning fabrication.
2. The steel support structure shall be designed in accordance with Standard Specification 643.023 for Traffic Signal Structures, with Fatigue Category II.
3. The steel support structure shall be installed on a steel reinforced concrete foundation. The foundation should be a drilled shaft foundation in accordance with Standard Specification 626.034 for Concrete Foundations.

4. The Contractor shall prepare shop drawings and structural calculations to support the size of the concrete foundation proposed for the steel support pole. Precast foundations are permitted if the diameter of the foundation is 24 inches or less and if the height of the steel support pole is 30 feet or less. The foundation design shall conform to the requirements of Standard Specification 626.036, regardless whether the installation will be precast or cast-in-place.
5. The solar panels required for the RWIS system shall be mounted on a steel support structure and concrete foundation conforming to these requirements.

654.031 RWIS System Construction Requirements: The Contractor shall install the RWIS system equipment in accordance with the Plans. The Contractor shall be responsible for all other work to provide a fully functional, operational, and integrated RWIS system at the locations identified in the Plans.

The Contractor shall install, configure, integrate, and test the RWIS System data into the Compass ATMS and its Road and Weather software. The RWIS System Equipment shall continuously measure and record RWIS System data. The system data shall be available to MaineDOT in the Compass ATMS mapping feature and other related internal programs.

1. Power Requirements
    a. Each RWIS location shall be supplied with adequate power to meet the site and sensor design loads. The power may be AC (public utility power as provided by others) or DC (solar power system) as required by the Plans.
    b. Where AC power is provided by others, the Contractor shall coordinate the power connections at the controller cabinet.
    c. Where solar power is provided, the Contractor shall furnish, install, configure and test the solar power system equipment to provide the required power to the RWIS equipment.

2. Grounding System Requirements
    a. All RWIS sites shall be grounded to a minimum of 25 ohms to ground. If other national, state, or local grounding requirements are more stringent than those of the manufacturer, the applicable national, state, or local code shall apply.
    b. The Contractor shall install solid copper or copper clad ground rod (minimum ¾-inch x 10-foot) along with #4 AWG ground wire and fittings at the base of the RWIS equipment pole. The Contractor shall install additional ground rods required to meet the minimum grounding requirement.
    c. The Contractor shall install ground rod(s) for the solar panel support pole to achieve a minimum of 25 ohms to ground.
    d. The ground wire shall be exothermically welded to each ground rod installed with all ground rods attached to every other ground rod via the ground wire.

e. The RWIS grounding system shall be bonded to the controller enclosure bus-bar and the steel support structure in accordance with National Electric Code (NEC) requirements.
f. The solar panel support grounding system shall be bonded to the steel support structure.

3. Communication Requirements
   a. The Contractor shall furnish and install a cellular modem compatible with the RWIS system and with the MaineDOT communications system.
   b. The RWIS system shall transmit weather sensor data to Compass and MaineDOT's Road and Weather software currently in operation.
   c. The Contractor shall provide all necessary equipment, cables, hardware, and ancillary equipment to capture the RWIS sensor data and transmit the data to Compass and to the Road and Weather software at the MaineDOT TMC.
   d. The communication system shall allow for configuration control and trouble-shooting of the RWIS equipment through both a local onsite connection and through a remote connection to the controller.

4. Software and Integration Requirements
   a. The Contractor shall provide the qualifications of the System Integrator to the Department as a condition of Contract Award as described in Special Provision 103. All work associated with system integration shall be under the direct supervision of the System Integrator. The System Integrator shall demonstrate working knowledge of Compass and have experience working with the RWIS System data to be supplied under this project.
   b. The RWIS System shall be fully compatible with the Compass and the current MaineDOT Road and Weather software.
   c. If the Contractor proposes to supply equipment that is not fully compatible with Compass or the current Road and Weather software, the Contractor shall be required to fully integrate the non-compatible equipment into Compass and the Road and Weather software so that the new equipment operates in the programs in the same manner as the existing RWIS. All costs associated with software development, coordination with the New England Compass ATMS developer, and for all integration services shall be the responsibility of the Contractor.
   d. The Contractor shall be responsible for the cost of integration and for the first six months of the Road and Weather Software licensing fees. After the initial six month period, the software licensing fees will be paid by MaineDOT.
   e. The Contractor shall update the map feature and station summary pages of Compass for each new RWIS site installed on this project.
   f. The Contractor shall ensure that Compass and the Road and Weather software reporting functions include and incorporate the new RWIS sites installed on this project.
   g. The RWIS system shall have the capability of generating alerts, watches, or warning. The user shall have the ability to set no less than two levels of

alarms, both an audible and visual alarm, displayed on the operator's screen when viewing the Road and Weather software. The system shall have the ability to inform automatically via email when alarm criteria is met.

h. RWIS System data integration shall be accomplished with minimal interruption to the existing MaineDOT Traffic Management Center (TMC) operations or the existing Road and Weather software in use at the TMC. Any required downtime of the Compass ATMS shall be approved by the Resident at least seven (7) days in advance. The System Integrator shall use the Compass ATMS test environment to demonstrate the system operations prior to going live with the RWIS System data.

5. Sawing Bituminous Pavement
    a. Sawcutting bituminous pavement shall be with a power-driven saw with an abrasive blade of sufficient width to provide the required cuts.
    b. The sawcut shall be vertical and not exceed two inch depth.
    c. Debris from the sawing operation shall be removed and disposed of by the Contractor before reopening the roadway to traffic.

6. System Testing
    a. All RWIS sensors and equipment installed under this project shall be tested prior to final acceptance. There are three stages of tests required: Stand-Alone Testing, Central Control Testing, and Operational Testing. Subsystem testing will not be required.
    b. Testing shall be conducted in accordance with Special Provision 654.
    c. Supplemental Testing Requirements
        i. Stand-Alone Testing - If a sensor or unit fails to pass the stand-alone test, the Contractor shall correct the problem or replace the sensor or unit and retest until satisfactory results are achieved.
        ii. Central Control Test Requirements – This test shall be performed at the TMC in Augusta in Compass and the MaineDOT Road and Weather software. This test shall verify that all the RWIS sensors and equipment and transmitting data to the appropriate software in accordance with the Contract Documents.
        iii. Operational Testing – The RWIS system must demonstrate successful transmission of data and be fully integrated with the TMC operations. In the event that there is a single failure associated with any RWIS component or data transmission, the test shall be suspended while the Contractor resolves the failure (either by fixing the sensor or replacing the sensor). Upon successful repair/replacement, the test shall continue to the end of the 30 days, or a minimum of seven days, whichever is longer. Upon the failure of any second sensor or equipment, the Operational Test period shall be restarted for the full 30 days upon repair/replacement. The completion of the Operational Test period and the submission of all test reports shall be documented as the date of Final System

Acceptance, provided all other work has been completed to the satisfaction of the Resident.

d. MaineDOT reserves the right to examine and test/retest any and all test steps for the project as Quality Assurance. If MaineDOT determines that any test procedure does not show the result indicated by the final test results, the Contractor shall update and/or repair the defect at no additional cost to the Department.
e. As part of the final testing, the Contractor shall provide to MaineDOT a complete set of maintenance and user manuals along with all the wiring and assembly schematics/diagrams, including any material safety data sheets (MSDS), prepared by the manufacturer and any toxic substances (coatings, liquids, or other) used.

7. Training
    a. If the Contractor elects to provide new or modified Road and Weather software, the Contractor shall provide a training program consisting of the furnishing of educational training in the operation of the new software.
    b. The training shall be scheduled after Stand-Alone Testing but prior to the end of the Operational Testing period.
    c. The Contractor shall provide qualified instructors familiar with the operation of the software to conduct the training. Training shall consist of hands-on demonstrations as feasible.
    d. The Contractor shall develop and supply all necessary manuals, displays, class notes, visual aids, and other instructional materials as required to conduct the training program. The Contractor shall supply sufficient materials for up to 10 participants, plus one spare copy of all materials.
    e. Training will be conducted at the MaineDOT Main Office in Augusta, Maine. The Contractor shall coordinate a specific classroom facility with the Resident at least three weeks prior to the training date.
    f. The training session shall be up to four (4) hours and shall accommodate up to 10 people. Typical training topic areas include:
        i. An overview of the software and its operation.
        ii. New/modified features of the software.
        iii. Interactions of the Road and Weather software with Compass ATMS.
        iv. Producing reports using the Road and Weather software.

654.061 Method of Measurement: Road Weather Information Station (RWIS) equipment will be measured for payment by the lump sum complete in place per site, satisfactorily installed, tested, operational, and accepted.

654.07 Basis of Payment: Road Weather Information Station (RWIS) equipment will be paid for at the contract lump sum price for each location. Such price will be full compensation for furnishing and installing all materials, including but not limited to the sensors; CCTV camera; controller and enclosure cabinets with all internal hardware; solar power service; support poles and foundations; communication equipment; grounding;

sawcutting pavement; integration and software modifications; system testing; training; warranties and guaranties; and all appurtenances and incidentals required for a complete and functional installation and for furnishing all assembly hardware, tools, labor, and testing necessary for completing the installation.

Payment will be made under the following:

Pay Item		Pay Unit
654.53	Road Weather Information Station	LS

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.3334 Fiber Optic Splice. This item of work shall conform to this specification. This item shall consist of performing and testing fiber optic splices on single mode fiber optic cables at the locations shown on the plans or as directed by the Resident.

654.3335 Fiber Optic Splice Vault. This item of work shall conform to this specification. This item shall consist of furnishing and installing manholes and splice vaults along a conduit system for the pulling and storage of underground fiber optic cable and fiber optic splice enclosures at the locations shown on the plans or as indicated by the Resident.

654.026 Fiber Optic Splice Vault Materials: In addition to the details and requirements shown on the plans, the Splice Vault and Manhole Frame and Cover shall be in accordance with the minimum requirements specified in the MaineDOT Standard Specifications Section 604.

1. The Fiber Optic Splice Vault (also known as a fiber optic manhole when a splice enclosure is not installed) shall be precast concrete designed to support HS20 wheel loading.
2. The Fiber Optic Splice Vault shall be of the minimum interior dimensions shown in the Plans.
3. The Fiber Optic Splice Vault shall have an open bottom to allow for drainage.
4. The top of the Fiber Optic Splice Vault shall include a frame and cover.
    a) Frames and covers shall be designed to withstand HS20 wheel loading.
    b) Covers shall have a non-skid surface embossed with the logo FIBER on it. Additional embossing shall be installed as shown on the plans or as directed by the Resident.
    c) At least two (2) hex bolts shall be used to lock the cover in place
5. Cable support brackets shall be galvanized steel.
6. Base materials for setting splice vaults and manholes shall conform to MaineDOT Standard Specifications Section 203.

654.031 Fiber Optic Splices and Splice Vaults Requirements:

1. The top of the manhole cover shall be set at grade. A concrete lock-in feature shall be provided around the top of the manhole.
2. When splice vaults are installed on a slope with a grade of 6:1 or flatter, the frame and cover shall be installed level and even with the surrounding grade. Fine grading may be required for splice vaults installed on slopes to maintain grade.
3. When splice vaults are installed on a slope with a grade greater than 6:1, the frame and

cover shall be installed level. The frame and cover shall be built up with brick and motor leveling course such that the precast portion of the splice vault remains a minimum of 15 inches below grade everywhere.

4. Soil in the vicinity of the manhole shall be vibrated and thoroughly compacted around the entire splice vault and frame up to final grade.
5. Splice vault frames shall be bonded to a bare copper ground wire that is cadwelded to a ¾" x 10' ground rod. The manhole cover shall be bonded to the frame with a bonding strap at least 18 inches long.
6. Where conduit ducts terminate at the manhole, the Contractor shall break into the manhole through the knock-outs on the side and seal the opening between the ducts and manhole with a watertight sealer approved by the Resident. No holes may be punched in the precast splice vault except through the knock-outs provided.
7. Cable support brackets shall have smooth surfaces to prevent cable damage, the spacing of the support brackets shall ensure that the cable when hung meets or exceeds the minimum bend radius of the cable.
8. The splice vault shall be placed on a minimum bed depth of 6 inches of crushed stone and 6 inches of compacted gravel borrow. The bedding of stone shall be at least 6 inches wider than the exterior dimensions of the splice vault. The bedding of gravel shall be a minimum of 12 inches wider than the outer dimensions of the stone bedding.
9. Fiber Optic Splices: All fiber optic splicing shall be performed using fusion splicing technique.
    a) Splices shall not exceed 0.1 dB loss.
    b) Completed splices shall be packaged in a protective, waterproof sleeve.
    c) For splicing at splice enclosures, completed splices shall be contained and restrained in splice trays.
    d) For splicing at patch panels, completed splices shall be secured in splice trays and terminated at pigtails that are than terminated on an adapter panel.
    e) See Special Provision 654 for details on fiber optic splice testing.

654.061 Method of Measurement:

1. The Fiber Optic Slice Vault will be measured by each unit furnished and installed but will not be deducted from the length of conduit.

2. Fiber Optic Splices shall be paid for per each splice performed, tested, and accepted.

654.07 Basis of Payment:

1. The accepted quantity of Fiber Optic Splice Vault will be paid for at the Contract unit price per each manhole furnished and installed complete. Payment will be full compensation for furnishing and installing the precast vaults, manhole frames and covers, ground rods, ground wire, bonding straps, cable support brackets, reinforcing steel,

crushed stone, gravel borrow, brick leveling courses, saw cutting, excavation, backfill, fine grading, and restoration of adjacent surfaces, and for all other materials and equipment specified. Payment shall include furnishing all labor, tools, hardware, materials, equipment, and incidentals necessary to complete the work.

2. The accepted quantity of Fiber Optic Splices will be paid for at the Contract unit price per each splice performed, tested, and completed. Payment will be full compensation for installing, connecting, protecting and testing the fiber optic splices, and for all labor, tools, hardware, materials, equipment, and incidentals necessary to provide complete fiber optic splices.

Payment will be made under the following:

Pay Item		Pay Unit
654.3334	Fiber Optic Splice	Each
654.3335	Fiber Optic Splice Vault	Each

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.3334 Fiber Optic Splice. This item of work shall conform to this specification. This item shall consist of performing and testing fiber optic splices on single mode fiber optic cables at the locations shown on the plans or as directed by the Resident.

654.3335 Fiber Optic Splice Vault. This item of work shall conform to this specification. This item shall consist of furnishing and installing manholes and splice vaults along a conduit system for the pulling and storage of underground fiber optic cable and fiber optic splice enclosures at the locations shown on the plans or as indicated by the Resident.

654.026 Fiber Optic Splice Vault Materials: In addition to the details and requirements shown on the plans, the Splice Vault and Manhole Frame and Cover shall be in accordance with the minimum requirements specified in the MaineDOT Standard Specifications Section 604.

1. The Fiber Optic Splice Vault (also known as a fiber optic manhole when a splice enclosure is not installed) shall be precast concrete designed to support HS20 wheel loading.
2. The Fiber Optic Splice Vault shall be of the minimum interior dimensions shown in the Plans.
3. The Fiber Optic Splice Vault shall have an open bottom to allow for drainage.
4. The top of the Fiber Optic Splice Vault shall include a frame and cover.
    a) Frames and covers shall be designed to withstand HS20 wheel loading.
    b) Covers shall have a non-skid surface embossed with the logo FIBER on it. Additional embossing shall be installed as shown on the plans or as directed by the Resident.
    c) At least two (2) hex bolts shall be used to lock the cover in place
5. Cable support brackets shall be galvanized steel.
6. Base materials for setting splice vaults and manholes shall conform to MaineDOT Standard Specifications Section 203.

654.031 Fiber Optic Splices and Splice Vaults Requirements:

1. The top of the manhole cover shall be set at grade. A concrete lock-in feature shall be provided around the top of the manhole.
2. When splice vaults are installed on a slope with a grade of 6:1 or flatter, the frame and cover shall be installed level and even with the surrounding grade. Fine grading may be required for splice vaults installed on slopes to maintain grade.
3. When splice vaults are installed on a slope with a grade greater than 6:1, the frame and

cover shall be installed level. The frame and cover shall be built up with brick and motor leveling course such that the precast portion of the splice vault remains a minimum of 15 inches below grade everywhere.

4. Soil in the vicinity of the manhole shall be vibrated and thoroughly compacted around the entire splice vault and frame up to final grade.
5. Splice vault frames shall be bonded to a bare copper ground wire that is cadwelded to a ¾" x 10' ground rod. The manhole cover shall be bonded to the frame with a bonding strap at least 18 inches long.
6. Where conduit ducts terminate at the manhole, the Contractor shall break into the manhole through the knock-outs on the side and seal the opening between the ducts and manhole with a watertight sealer approved by the Resident. No holes may be punched in the precast splice vault except through the knock-outs provided.
7. Cable support brackets shall have smooth surfaces to prevent cable damage, the spacing of the support brackets shall ensure that the cable when hung meets or exceeds the minimum bend radius of the cable.
8. The splice vault shall be placed on a minimum bed depth of 6 inches of crushed stone and 6 inches of compacted gravel borrow. The bedding of stone shall be at least 6 inches wider than the exterior dimensions of the splice vault. The bedding of gravel shall be a minimum of 12 inches wider than the outer dimensions of the stone bedding.
9. Fiber Optic Splices: All fiber optic splicing shall be performed using fusion splicing technique.
    a) Splices shall not exceed 0.1 dB loss.
    b) Completed splices shall be packaged in a protective, waterproof sleeve.
    c) For splicing at splice enclosures, completed splices shall be contained and restrained in splice trays.
    d) For splicing at patch panels, completed splices shall be secured in splice trays and terminated at pigtails that are than terminated on an adapter panel.
    e) See Special Provision 654 for details on fiber optic splice testing.

654.061 Method of Measurement:

1. The Fiber Optic Slice Vault will be measured by each unit furnished and installed but will not be deducted from the length of conduit.

2. Fiber Optic Splices shall be paid for per each splice performed, tested, and accepted.

654.07 Basis of Payment:

1. The accepted quantity of Fiber Optic Splice Vault will be paid for at the Contract unit price per each manhole furnished and installed complete. Payment will be full compensation for furnishing and installing the precast vaults, manhole frames and covers, ground rods, ground wire, bonding straps, cable support brackets, reinforcing steel,

crushed stone, gravel borrow, brick leveling courses, saw cutting, excavation, backfill, fine grading, and restoration of adjacent surfaces, and for all other materials and equipment specified. Payment shall include furnishing all labor, tools, hardware, materials, equipment, and incidentals necessary to complete the work.

2. The accepted quantity of Fiber Optic Splices will be paid for at the Contract unit price per each splice performed, tested, and completed. Payment will be full compensation for installing, connecting, protecting and testing the fiber optic splices, and for all labor, tools, hardware, materials, equipment, and incidentals necessary to provide complete fiber optic splices.

Payment will be made under the following:

Pay Item		Pay Unit
654.3334	Fiber Optic Splice	Each
654.3335	Fiber Optic Splice Vault	Each

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.312 Uninterruptible Power Supply (UPS): This item shall consist of furnishing and installing Uninterruptible Power Supply (UPS).

654.026 UPS Materials: The UPS shall meet the following requirements:

1. The UPS shall be connected to each public utility-powered ITS device and communications equipment with a capacity to supply power to everything within the cabinet for no less than 24 hours after loss of power unless otherwise noted in the Contract Documents.
2. The UPS shall be sized to provide power to all 120 VAC loads described herein, plus 50% spare power capacity. The Contractor shall supply load calculations to the Resident for approval prior to procurement of the UPS.
3. The UPS shall include a remote power manager (RPM) unit that includes a minimum of six 120 VAC outlets. Each of the 120 VAC outlets shall be individually controllable from the Transportation Management Center (TMC) via TCP/IP. In addition, the RPM shall include the ability to program time-of-day/day-of-week schedules whereby each of the 120 VAC outlets can be individually controlled by these schedules. The RPM shall include an RJ45 Ethernet port.
4. The UPS batteries (as required) shall be sized to provide a hold-up time to all connected loads, plus the required spare capacity, of 24 hours minimum. The Contractor's load calculations shall include storage capacity of the batteries.
    a) At the end of the 24 hour hold-up time, the batteries shall not exceed 50% of their capacity discharge.
    b) The UPS batteries shall be of the sealed, maintenance free type.
5. During the transfer from utility power to UPS power, there shall be no transfer or switchover time, i.e., the maximum transfer or switchover time shall be zero seconds.
6. The UPS shall provide true sine wave power to all connected loads. The UPS output total harmonic distortion shall not exceed 2 percent.
7. Each cabinet-mounted UPS unit shall be SNMP compatible to allow being configured and integrated for remote monitoring via TCP/IP from the TMC. Any software required to monitor all UPSs shall be furnished, configured and integrated into the TMC monitoring system. The UPS monitoring software shall meet one of the following requirements:
    a) Monitoring software shall be licensed and installed on a minimum of 10 computers at the TMC;
    b) Monitoring software shall be accessible from a state and/or a vendor server; or

c) Monitoring software shall be web based.

8. The UPS monitoring software shall provide the following capabilities, as a minimum:
    a) Data logging
    b) Event logging
    c) Fault notification
    d) Unattended system shutdown
    e) Hibernation
    f) Manage all network UPS units
    g) Operating system shutdown
    h) Power event summary
    i) Run command file

9. The UPS shall have at least one RJ45 Ethernet connector for remote monitoring as well as local connection to a laptop computer for configuration.
10. The UPS shall have status indicators that display, as a minimum:
    a) Power
    b) Remaining battery capacity, as a ratio of total battery capacity
    c) Load level, as a ratio of maximum UPS capacity
    d) Overload
    e) Battery failure
11. The UPS shall be field hardened and rated by its Manufacturer in accordance with the operating temperature, storage temperature, and relative humidity requirements of the NEMA TS2 Standard. The design shall be inherently temperature compensated to prevent abnormal operation. The circuit design shall include such compensation as is necessary to overcome effects due to temperature in the specified environmental range.
12. The UPS shall have a manual power on/off switch.
13. The UPS shall have transient voltage surge protection that protects itself as well as connected loads against normal mode and common mode power line transients and surges. The UPS shall be capable of providing surge protection of 800 joules, minimum and 6500 amperes, maximum. The UPS response time to transients and surges shall be no more than 5 nanoseconds.
14. The UPS shall provide output voltage regulation. The output voltage variation shall not exceed 5 percent.

15. The UPS shall include two Category 6 (Cat6) Ethernet patch cords, a minimum of three feet in length and terminated on both ends with Type RJ45 connectors.

654.031 UPS Construction Requirements:

1. The UPS and its Remote Power Manager shall be housed in the ITS Equipment Cabinet and shall supply power to all cabinet devices and connected ITS equipment except as otherwise indicated.
2. In the event that the ITS Equipment Cabinet includes heaters and/or supplemental air conditioner, or spare 120 VAC convenience outlets, these cabinet devices are not required to be connected to the UPS power and should not be considered in the load calculations.
3. The UPS shall be connected to a 120 VAC, non-GFCI line power outlet. The Contractor shall supply additional power strip(s) as needed to facilitate plugging all cabinet equipment into the RPM.
4. All equipment connected to the UPS shall be properly connected and insulated to prevent shock hazard.
5. The Contractor shall be responsible for providing remote access to the UPS control software from the TMC as required by this specification. The software shall be configured to display the correct battery backup amp-hour ratings.
6. The UPS shall be connected to the Ethernet switch via an Ethernet patch cord.
7. The UPS shall be connected to the RPM via an Ethernet patch cord.
8. The Contractor shall test the UPS by providing a load equivalent to 150% of the design load (design load + 50% spare) for 24 hours to ensure hold up time and battery discharge meet the specifications.

654.061 Method of Measurement: Uninterruptible Power Supply shall be measured by each device installed, connected, tested and accepted in place.

654.07 Basis of Payment: The accepted quantities of UPS will be paid for at the contract unit price each complete in place. Payment shall be full compensation for furnishing, installing, configuring and testing all UPS, RPM, batteries, connecting cables, supplemental power strips, Ethernet patch cords, and for all tools, equipment, labor, and incidentals necessary for completing the installation.

Payment will be made under:

Pay Item		Pay Unit
654.312	Uninterruptible Power Supply (UPS)	Each

SPECIAL PROVISION
SECTION 703
AGGREGATES

Remove and replace subsection 703.06 Aggregate for Base and Subbase with the following:

703.06 Aggregate for Base and Subbase The following shall apply to Sections (a.) and (c.) below. The material shall have a Micro-Deval value of 25.0 or less as determined by AASHTO T 327. If the Micro- Deval value exceeds 25.0, the Washington State Degradation DOT Test Method T113, Method of Test for Determination of Degradation Value (January 2009 version) shall be performed, except that the test shall be performed on the portion of the sample that passes the ½ in sieve and is retained on the No. 10 sieve. If the material has a Washington Degradation value of less than 15, the material shall be rejected.

The material used in Section (b.) below shall have a Micro-Deval value of 25.0 or less as determined by AASHTO T 327. If the Micro-Deval value exceeds 25.0 the material may be used if it does not exceed 35 percent loss on AASHTO T 96, Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

Recycled Asphalt Pavement (RAP) shall not be used for or blended with aggregate base or subbase.

a. Aggregate for base, Type A and B shall be crushed ledge or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3 inch sieve shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Type A	Type B
½ inch	45-70	35-75
¼ inch	30-55	25-60
No. 40	0-20	0-25
No. 200	0-6.0	0-6.0

At least 50 percent by weight of the material retained on the No. 4 sieve shall have at least one fractured face as tested by AASHTO T 335.

Type A aggregate for base shall only contain particles of rock that will pass the 2 inch square mesh sieve.

Type B aggregate for base shall only contain particles of rock that will pass the 4 inch square mesh sieve.

b. Aggregate for base, Type C shall be crushed ledge or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other

deleterious substances. The material shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
	Type C
4 inches	100
3 inches	90-100
2 inches	75-100
1 inch	50-80
½ inch	30-60
No. 4	15-40
No. 200	0-6.0

At least 50 percent by weight of the material coarser than the No. 4 sieve shall have at least one fractured face as tested by AASHTO T 335.

c. Aggregate for subbase shall be sand or gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3 inch sieve shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Type D	Type E
½ in	35-80	
¼ inch	25-65	25-100
No. 40	0-30	0-50
No. 200	0-7.0	0-7.0

Type D aggregate for subbase gravel may contain up to 50 percent by weight Recycled Concrete Aggregate (RCA). When RCA is used, the portion of the resulting blend of gravel and RCA retained on a ½" square mesh sieve shall contain a total of no more than 5 percent by weight of other recycled materials such as brick, concrete masonry block, or asphalt pavement as determined by visual inspection.

RCA shall be substantially free of wood, metal, plaster, and gypsum board as defined in Note 9 in Section 7.4 of AASHTO M 319. RCA shall also be free of all substances that fall under the category of solid waste or hazardous materials.

Aggregate for subbase shall not contain particles of rock which will not pass the 6 inch square mesh sieve.

SPECIAL PROVISION 700 - MATERIALS

SECTION 703 - AGGREGATES

The Standard Specification 700 – Materials, has been modified with the following revisions. All sections not revised by this Supplemental Specification shall be as outlined in Section 700 of the Standard Specifications.

703.07 Aggregates for HMA Pavements Coarse and fine aggregate for hot mix asphalt pavements shall be of such gradation 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.

Coarse aggregate, that material retained on the No. 4 sieve, shall be crushed stone or crushed gravel and, unless otherwise stipulated, shall consist of clean, tough, durable fragments free from an excess of soft or disintegrated pieces and free from stone coated with dirt or other objectionable matter. Coarse aggregate shall not exceed an absorption of 2.0 percent by weight as determined by AASHTO T 85.

Fine aggregate, material that passes the No. 4 sieve, shall consist of natural sand, manufactured sand, or a combination of these. It shall consist of hard, tough grains, free from injurious amounts of clay, loam, or other deleterious substances. Fine aggregate shall not exceed an absorption of 2.3 percent by weight as determined by AASHTO T 84.

All individual aggregates for hot mix asphalt pavements shall meet Table 3 requirements (excluding LCP) unless otherwise noted. The Department reserves the right to sample and test the composite aggregate for any of the following properties at any time:

TABLE 3: Aggregate Consensus Properties Criteria

Estimated Traffic, Million 18 kip ESALs	AASHTO T 335 Coarse Aggregate Angularity (minimum)	AASHTO T 304 Method A Uncompacted Void Content of Fine Aggregate (minimum)**	ASTM D 4791 (8.4) Flat and Elongated Particles (maximum)	AASHTO T 176 Clay Content/ Sand Equivalent (minimum)	AASHTO T 327 Coarse Micro-Deval (maximum)
< 3.0	75/60	40	10	45	18.0%*
3.0 to < 10	90/80	45		50	
≥ 10	95/90				18.0%

* In the event the material exceeds the Micro-Deval limit, a Washington Degradation test shall be performed. The material shall be acceptable if it has a value of 30 or more as determined by Washington State DOT Test Method T 113, Method of Test for Determination of Degradation Value except that the reported degradation value will be the result of testing a single composite specimen from that portion of the sample that passes the ½ inch sieve and is retained on the No. 10 sieve.

** Property will be evaluated on a mix design basis by calculating a weighted average based upon individual aggregate values (weighted average by the percentage proportion of the aggregate within the design).

ASTM D 5821 - "90/80" denotes that 90 percent of the coarse aggregate has one fractured face and 80 percent has two fractured faces.

AASHTO T 304 - Criteria are presented as percent air voids in loosely compacted fine aggregate, (U).

ASTM D 4791 - Criteria are presented as maximum percent by weight of flat and elongated particles (5:1 ratio).

The entire HMA wearing course shall come from the same source of material and the same job mix formula, except when permission is obtained from the Department to change sources.

703.09 HMA Mixture Composition The coarse and fine aggregate shall meet the requirements of Section 703.07. The several aggregate fractions for mixtures shall be sized, graded, and combined in such proportions that the resulting composite blends, including RAP aggregate will meet the grading requirements of the following table:

Aggregate Gradation Control Points

Nominal Maximum Aggregate Size---Control Points (Percent Passing)						
Sieve Designation	Type 25 mm	Type 19 mm	Type 12.5 mm	Type 9.5 mm	Type 9.5 mm Thin Lift Mixture (TLM)	Type 4.75 mm
	Percent By Weight Passing - Combined Aggregate					
37.5 mm	100					
25 mm	90-100	100				
19 mm	-90	90-100	100			
12.5 mm	-	-90	90-100	100	100	100
9.5 mm	-	-	-90	90-100	95-100	95-100
4.75 mm	-	-	-	-90	60-95	80-100
2.36 mm	19-45	23-49	28-58	32-67	47-65	40 - 80
1.18 mm	-	-	-	-	-	-
0.60 mm	-	-	-	-	-	-
0.30 mm	-	-	-	-	-	-
0.075 mm	2.0-6.0	2.0-6.0	2.0-6.0	2.0-7.0*	2.0-7.0*	2.0-7.0

* For 9.5 mm nominal maximum aggregate size mixtures, the maximum design aim for the percent passing the 75 μm sieve is 6.5%.

September 09, 2021

SPECIAL PROVISION
SECTION 717
ROADSIDE IMPROVEMENT MATERIALS
(Seed)

717.03 Seed Revise this Sub Section by removing the material property tables for "Method #1 - Park Mixture" and "Method #2 - Roadside Mixture #2" and replace with the following:

Seed Mixtures shall consist of seed proportioned percent by weight as follows:

Method #1 – Park Mixture	
Specification	**Property**
Turf Type Tall Fescue	40% +/- 2%
85/80 Kentucky Bluegrass	25% +/-2%
Perennial Rye Grass	20% +/-2%
Annual Ryegrass	15% +/- 2%

Method #2 – Roadside Mixture #2	
Specification	**Property**
Turf Type Tall Fescue	60% +/-2%
White Clover	5% +/-2%
Perennial Rye Grass	15% +/-2%
Annual Ryegrass	20% +/-2%

This special provision is temporary while supplies are limited and may be Modified to the Seed Mix in the March 2020 Standard Specification Book when supplies are available again.

SPECIAL PROVISION
SECTION 910
SPECIAL WORK
(Utility Conduit Underground)

910.1 Description This item shall consist of all work shown on the Plans and described in this Special Provision. This Special Provision is limited to the work from the tie-in points identified on the Lambert Road Bridge Plans. The limit of the work located at the Lambert Crossing ranges between Riser Poles provided by others approximately between Sta 6+70 and St 12+55. The underground concrete encased duct branch will be shared between Versant, Consolidated Communications, and Charter Communications. The installation of a utility vault is covered in a separate section. Work also includes continuing conduits to each of the riser poles. A short drain stub is to be provided from the vault. The construction and final outlet to daylight will be provided by others.

910.2 Materials The Contractor is responsible for the furnishing and fabrication of all material and associated hardware as shown on the Plans and described in this specification.

The conduits shall be concrete-encased, non-metallic conduit conforming to Standard Specification 626 unless otherwise shown in the Plans. Concrete shall have a minimum 28-day compressive strength of 3,000 psi.

Granular Borrow shall conform to the Standard Specifications.

Pull string provided within each conduit shall be mule tape rated at 5,000 pounds and shall extend continuously through the entire run of each conduit as located on the Plans. Installation of conduit cables will be performed by Others.

910.3 General Utility conduit installation shall consist of furnishing and installing all materials and labor for the installation of the concrete encased conduits noted on the Plans. This generally includes the installation of:

- Two (2) 5” Schedule 40 conduits encased in concrete with warning tape from riser pole station 6+70 to riser pole Station 12+55 (power).
- Three (3) 4” Schedule 40 conduits encased in concrete with warning tape from riser pole Station 6+70 to riser pole Station 12+55 (two conduits reserved for Consolidated, one conduit reserved for Charter).

Included in this work is the installation of conduit transition to rigid steel galvanized conduits terminating at each riser pole. Warning tape shall be installed at all buried conduits.

910.4 Submittals The Contractor shall, within 60 days following execution of the Contract, submit a list of materials which are to be installed. The list shall include the manufacturer, size, components, dimensions, and identifying number of each item. The list shall be supplemented by such data as may be required, including detailed scale drawings of proposed minor deviations from the Plans. The Contractor shall submit for review, design data and sample articles of the material proposed for use.

910.5 Construction A minimum of two weeks prior to beginning conduit installation work, a meeting shall be held with members of Versant, Consolidated, Charter, the MaineDOT Resident, and the Contractor to discuss and coordinate the work progression.

Conduits shall be installed in accordance with Standard Specification 626 and the requirements identified herein.

Workmanship shall conform to the requirements of: NEC, NESC, ASTM Standards, and the ANSI, the local Utility Companies, the State of Maine, Manufacturers Specifications and any local ordinances that may apply except when otherwise noted on the Plans or in the Special Provisions.

Conduits shall be of the sizes noted on the Plans, which are indicated as the nominal inside diameter. All conduit bends shall be made with long radius bends.

The Contractor shall be responsible for and shall repair all damage caused to underground drainage structures, utilities, or conduits, etc., which are encountered during construction.

Where conduit runs are placed parallel to other conduits, they shall be separated per details shown on Plans. Power conduits shall be separated from communication conduits with rigid insulation.

The Contractor shall install pull-string in all conduits. The ends of the lines shall be labeled and secured in such manner as to prevent accidental withdrawal of the wire. All conduit ends shall be capped with watertight conduit caps.

The Contractor shall provide a metal tracer wire and a 6" wide "buried cable" plastic warning tape located 6"-12" below grade at each underground conduit.

910.6 Method of Measurement Special Work – Utility Conduit Underground shall be measured by the lump sum, complete and accepted.

910.7 Basis of Payment All work for Special Work – Utility Conduit Underground will be paid at the contract lump sum price. Payment shall be full compensation for all materials, equipment, labor, and hardware necessary to install the utility conduits. Payment for work shall include furnishing and installing concrete encased, non-metallic conduit, associated conduit fittings (including pull-lines and watertight caps), and any required excavation and backfill

with Granular Borrow. Installation of conduit cables will be performed by Others.

Payment will be made under:

Pay Item		Pay Unit
910.301	Special Work – Utility Conduit Underground	Lump Sum

City of Brewer, ME

I-395 – Route 9 Connector Water Main Replacement

Issue for Bid
Not for Construction

80 Exchange Street, Suite 400, Bangor, ME 04401

229924.02
City of Brewer, ME

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

September 2021

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Project Description

B. Description of the Work

C. Work Sequence and Coordination

D. Special Requirements

1.02 DESCRIPTION OF THE WORK

A. The Work includes labor, material and equipment, services required for construction, testing, and commissioning of the Project in accordance with the Contract Documents and as more specifically described in the Specifications and Drawings and includes, but is not limited to, the following principal features:

1. Eastern Avenue Bridge Water Main Replacement

2. Levenseller Road Bridge Water Main Replacement

B. Work Site Locations: Generally, as shown on the Drawings.

C. Work by Others

1. The following Work will be performed in conjunction with the following Maine Department of Transportation (MDOT) projects:

a. Brewer-Holden, Penobscot County, Eastern Avenue Bridge-Levenseller Road Bridge over I-395 – Route 9 Connector, Project No. 1891500.

D. Existing Conditions and Site Data: Per the Drawings.

1.03 WORK SEQUENCE AND COORDINATION

A. Coordination

1. Ensure that facilities and system flows are maintained and remain in service at all times unless otherwise noted.

a. Obtain written approval of the Owner for shutdowns. Notify Owner a minimum of two weeks prior to any required shutdowns.

b. Coordinate Work with the City and Water Department and provide public notice, as required.

2. Maintain access to facilities for the Owner throughout the Project.

B. Sequence

1. Sequence Work to minimize shutdowns and reflect sequencing in the construction schedule.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 25

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the measurement and payment for the Work to be completed under each item in the Bid Form, which may also be referred to as "pay item".

B. Payment procedures are in accordance with the Contract.

C. Measurement: As determined, verified, or approved by Engineer or Owner in accordance with the Contract, except as otherwise specified.

D. Schedule of Values

1. Submit preliminary and final Schedule of Values.

2. Provide sufficient detail to allow for determination of the value of the Work at any degree of completion.

3. For each line item, identify number and title of related specification section.

E. The Work described in each pay item shall be as described in the Specifications and shown on the Drawings and not included in other pay items.

1. Pay item descriptions are general and may not specifically describe all associated Work or elements thereof, do not constitute Specifications, and do not supersede the content of the Specifications and Drawings.

2. Review the Specifications and Drawings for Work associated with each pay item. Claims for being unfamiliar with the content of the Specifications and Drawings will not be considered.

F. The following Work is not specifically described or designated as a pay item, is considered incidental to all pay items, and shall not be measured separately for payment.

1. Restoration of unpaved areas disturbed by the Contractor within the limits of Work.

2. Restoration of landscaping within the limits of Work.

3. Record Documents

G. Payment will not be made for restoration of areas disturbed by the Contractor outside the limits of Work.

H. Payment will only be made for those utility services, including water, specifically identified for replacement on the Drawings. Relocation or replacement for the Contractor's convenience or due to breakage by the Contractor of any other utility services shown on the Drawings, or at locations which could reasonably be assumed, shall be at no cost to Owner.

I. Design, installation and removal of excavation support systems, temporary and permanent utility/structure support systems associated with a pay item shall be considered incidental to that pay item.

J. Additional dewatering and erosion control (including installation, operation, maintenance, removal, and off-Site disposal of erosion control devices) associated with a pay item shall be considered incidental to that pay item.

1.02 MEASUREMENT AND PAYMENT BASIS

ITEM 656.75: Temporary Soil Erosion and Water Pollution Control	
Measurement	Measured in accordance with Division 600 of the MDOT Standard Specifications.
Payment	Payment in accordance with Division 600 of the MDOT Standard Specifications.
Includes: Provide Temporary Soil Erosion and Water Pollution Control per Division 600 of the MDOT Standard Specifications.	

ITEM 659.10: Mobilization	
Measurement	Measured in accordance with Division 600 of the MDOT Standard Specifications.
Payment	Payment in accordance with Division 600 of the MDOT Standard Specifications.
Includes: Delivery to and removal of equipment from the Project Site, temporary utilities, facilities, and controls, obtaining necessary permits including associated fees, insurance and bond costs, signage, development of pre-construction schedules and plans required by the General Conditions, Supplementary Conditions and General Requirements; necessary pre-construction investigations, verifying existing field conditions, coordination, and Site clean-up, restoration, and closeout.	

ITEMS 822.36 and 822.37: 12-inch and 16-inch Class 52 D.I. Pipe Water Main	
Measurement	As measured along the horizontal projection of the centerline of the pipe.
Payment	Unit price per linear foot as stated in the Bid.
Includes: For drinking water utility piping, all excavation, backfill, shoring and bracing, dewatering, erosion control, bedding, insulation, heat trace, Class 52 DI water main, fittings, flushing, testing, disinfection, and all other materials and labor required to provide a complete installation not specified elsewhere. The connection to existing water mains shall be incidental to this item. Ductile iron pipe used in hydrant laterals shall not be included in this item and shall be included in Bid Item 824.30 – Fire Hydrant.	

ITEMS 823.331, 823.325, 823.31 and 823.375: 6-inch, 8-inch and 12-inch Gate Valves with Boxes and 16-inch Butterfly Valves with Boxes	
Measurement	Measured per each unit installed.
Payment	Unit price per each as stated in the Bid.
Includes: Provide valve and valve box, providing one valve box wrench to be used for all gate valves, excavation, backfill, shoring and bracing, swing ties and survey location of valve box for Record Documents, dewatering, erosion control, and all other materials and labor required to provide a complete installation as specified and shown on the Drawings. Gate valves for hydrants are not included in this item and shall be included in Bid Item 824.30 – Fire Hydrant.	

ITEM 824.3010: Fire Hydrant	
Measurement	Measured per each unit installed.
Payment	Unit price per each as stated in the Bid.
Includes: Provide all fittings, pipe, hydrant tee, 6-inch gate valve, valve box, hydrant extensions, if necessary, thrust blocks, accessories, earthwork and materials, swing ties and survey location of manhole for Record Documents, surface restoration including repairing sidewalks and curbs, loaming, and seeding, and all other materials and labor required to provide a complete hydrant tee, valve, and hydrant installation as specified and shown on the Drawings.	

ITEM 825.5411: Temporary Water Main	
Measurement	As measured along the horizontal projection of the centerline of the pipe.
Payment	Percent of Lump Sum (LS) price based on Schedule of Values.
Includes: All equipment, material, and labor associated with water main bypass piping necessary to provide uninterrupted service in areas noted within the Project area, including excavation, backfill, shoring and bracing, dewatering, erosion control, bedding, pipe, fittings including tees and wyes, thrust blocks, flushing, testing, disinfection, and all other materials and labor required to provide a complete installation not specified elsewhere. The connection to existing water mains shall be incidental to this item.	

ITEM 830.10: Water Main Bridge Crossing	
Measurement	Portion of the Work completed and accepted.
Payment	Percent of Lump Sum (LS) price based on Schedule of Values.
Includes: All Work associated with water main bridge crossings. Includes all materials, equipment, services, and construction inherent to the Work. Includes backfill, compaction, casing pipe end seals and appurtenances, Class 54 DI pipe, fittings, insulation, thrust blocks, heat tracing, insulation jacketing, pipe supports, conduit supports, shoring, bracing, site restoration, utility pedestal, electrical conduit, concrete encased electrical conduit, electrical wiring, testing, signage, and all Work not included in other bid items.	

ITEM #832.071: Electrical Service Allowance	
Measurement	Submit bills from Versant Power
Payment	Allowance (AL) - Actual costs incurred
Schedule of Payment	Monthly – based on actual costs incurred
All materials, equipment, services, and construction inherent to the Work. Includes installation of a new electrical service for the bridge, wiring and related appurtenances. Proposed utility pole indicated to be provided under a separate contract and shall not be eligible for payment as part of this item.	

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. Submittal Requirements: Submittal requirements specified in this Section include shop drawings, product data, Record Documents, and miscellaneous Work-related submittals. Individual submittal requirements are specified in applicable Sections for each unit of Work.

B. Definitions: Work-related submittals of this Section are categorized for convenience as follows:

1. Shop drawings include specially-prepared technical data for this Project, including drawings, diagrams, data sheets, schedules, patterns, instructions, measurements and similar information not in standard printed form.

2. Product data include standard printed information on materials, products and systems; not specially-prepared for this Project.

3. Samples include both fabricated and unfabricated physical examples of materials, products and units of Work; both as complete units and as smaller portions of units of Work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.

4. Miscellaneous submittals related directly to the Work (non-administrative) include warranties, quality testing and certifying reports, and copies of industry standards.

1.02 GENERAL SUBMITTAL REQUIREMENTS

A. Scheduling: Show principal Work-related submittals in job progress schedule.

B. Coordination and Sequencing: Coordinate preparation and processing of submittals with performance of the Work so that Work will not be delayed by submittals.

C. Preparation of Submittals: Provide permanent marking on each submittal to identify Project, date, Contractor, subcontractor, submittal name and similar information to distinguish it from other submittals. Show Contractor's executed review and approval marking.

D. Transmittal Form: Provide places to indicate Project, date, "To:", "From:", names of subcontractors, suppliers, manufacturers, required references, category and

type of submittal, purpose, description, distribution record (for both transmittal and submittals), and signature of transmitter.

1.03 SPECIFIC-CATEGORY SUBMITTAL REQUIREMENTS

A. General: Except as otherwise indicated in individual Sections, comply with requirements specified herein.

B. Format: Provide submittals in a clear and thorough manner, in English and using English units. Use sheet size of not less than 8 ½ by 11 inches and not more than 24 by 36 inches.

1. Submittals may be provided in electronic format with prior approval of the Engineer. Provide electronic files in PDF format.

C. Shop Drawings: Provide newly-prepared information, with graphic information at accurate scale (except as otherwise indicated), with name of preparer indicated (firm name). Show dimensions and note which dimensions are based on field measurement. Identify materials and products in the Work shown. Indicate compliance with standards and special coordination requirements. Do not allow shop-drawing copies without appropriate final "Action" markings by Engineer to be used in connection with the Work.

1. Submit 3 copies for Engineer’s use; all additional copies will be returned for Contractor’s use.

D. Product Data: Collect required data into one submittal for each unit of Work or system and mark each copy to show which choices and options are applicable to Project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, notation of field measurements, which have been checked, and special coordination requirements. Maintain one set of product data (for each submittal) at Project site, available for reference by Engineer and others.

1. Submit 3 copies for Engineer’s use; all additional copies will be returned for Contractor’s use.

E. Samples: Provide units identical with final condition of proposed materials or products for the Work. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with standards.

F. Inspection and Test Reports: See individual specification sections for inspection and test report requirements.

G. Warranties: Refer to "Products" section for specific general requirements on warranties, product/workmanship bonds, and maintenance agreements. In addition

to copies desired for Contractor's use, furnish 2 executed copies, except furnish 2 additional copies where required for maintenance manuals.

H. Standards: Where workmanship at Project site and elsewhere is governed by standard, furnish additional copies to fabricators, installers and others involved in performance of the Work.

I. Closeout Submittals: Refer to individual Sections and General Conditions for specific requirements.

J. Record Documents

1. Store Record Documents separate from documents used for construction. Record information concurrent with construction progress.

2. Legibly mark each item to record description of actual equipment and material installed and actual construction on approved submittals, including the following.

   a. Manufacturer's name and equipment and material model and number.

   b. Material and equipment substitutions or alternates utilized.

   c. Approved changes.

   d. Measured depths of foundations.

   e. Measured horizontal and vertical locations of Underground Facilities and appurtenances, referenced to permanent surface improvements.

   f. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

   g. Field changes of dimension and detail.

   h. Details not on original Contract Documents or Shop Drawings.

3. Conformed to Construction Record Drawings: Submit 6 prints and electronic files in .DWG format and PDF format on CD for Engineer’s use in preparing final Record Drawings. Indicate "Conformed by Contractor to Construction Records" in revision block and sign.

K. General Distribution: Provide additional distribution of submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators, installers, governing authorities, and others as necessary for proper performance of the Work. Include such additional copies in transmittal to Engineer where required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

1.04 ACTION ON SUBMITTALS

A. Engineer's Action: Engineer will review each submittal and return within 10 calendar days of receipt. Where submittal must be held for coordination, Contractor will be so advised by Engineer without delay.

B. Action Stamp: Engineer's action stamp, for use on submittals to be returned to Contractor, is self-explanatory as marked.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 42 00

DEFINITIONS AND STANDARDS

PART 1 – GENERAL

1.01 DEFINITIONS

A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other Contract Documents, including Drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in Contract Documents are defined generally in this article. Definitions and explanations of this Section are not necessarily either complete or exclusive but are general for the Work to the extent not stated more explicitly in another provision of the Contract Documents.

B. General Requirements: The provisions or requirements of Division 01 Sections. General Requirements apply to entire Work of Contract and, where so indicated, to other elements which are included in project.

C. Indicated: The term "Indicated" is a cross-reference to details, notes, or schedules on Drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Engineer," "requested by Engineer," etc. However, no such implied meaning will be interpreted to extend Engineer's responsibility into Contractor's area of construction supervision.

E. Approve: Where used in conjunction with Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval", by Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of Contract Documents.

F. Project Site: The space available to Contractor for performance of the Work, either exclusively or in conjunction with others performing other Work as part of the project. The extent of project site is shown on the Drawings and may or may not be identical with description of the land upon which project is to be built.

G. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

H. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing protecting, cleaning, and similar operations, as applicable in each instance.

I. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

J. Installer: The entity (person or firm) engaged by Contractor or its subcontractor or sub-subcontractor for the performance of a unit of Work at project site, including installation, erection, application, and similar required operations. It is a general requirement that such entities (Installers) be expert in operations they are engaged to perform.

K. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the Work, either at project site or elsewhere, and to report and (if required) interpret results of those inspections or tests.

1.02 SPECIFICATION EXPLANATIONS

A. Overlapping and Conflicting Requirements: Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, most stringent requirement (which is generally recognized to be also most costly) is intended and will be enforced, unless specifically detailed language written into the Contract Documents (not by way of reference to an industry standard) clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Engineer for a decision before proceeding.

B. Contractor's Options: Except for overlapping or conflicting requirements, where more than one set of requirements are specified for a unit of Work, option is intended to be Contractor's regardless of whether specifically indicated as such.

C. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the Work to be performed or provided. Except as otherwise specifically indicated, actual Work may either comply exactly with that minimum (within specified tolerances) or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Engineer for decision before proceeding.

D. Specialists; Assignments: In certain instances, specification text requires (or at least implies) that specific Work be assigned to specialists or expert entities, who must be engaged for performance of those units of Work. These must be recognized as special requirements over which Contractor has no choice or option. These assignments must not be confused with (and are not intended to interfere with) normal application of regulations, union jurisdictions and similar conventions. One purpose of such assignments is to establish which party or entity involved in a specific unit of Work is recognized as "expert" for indicated construction processes or operations. Nevertheless, final responsibility for fulfillment of entire set of requirements remains with Contractor.

1.03 INDUSTRY STANDARDS

A. General Applicability of Standards: Applicable standards of construction industry have same force and effect (and are made a part of Contract Documents by reference) as if copied directly into Contract Documents, or as if published copies were bound herewith.

1. Referenced standards (referenced directly in Contract Documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to Work.

2. Non-referenced standards recognized in the construction industry are hereby defined, except as otherwise limited in Contract Documents, to have direct applicability to the Work, and will be so enforced for performance of the Work.

B. Copies of Standards: Provide where needed for proper performance of the Work; obtain directly from publication sources.

C. Abbreviation and Names: Where acronyms or abbreviations are used in specifications or other Contract Documents, they are defined to mean the industry recognized name of trade association, standards generating organization, governing authority, or other entity applicable to context of text provision. Refer to "Encyclopedia of Associations," published by Gale Research Co., available in large libraries.

1.04 SUBMITTALS

A. Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 51 38

TEMPORARY WATER BYPASS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide, test, operate and maintain temporary water bypass system in accordance with the Drawings, or as modified by Contractor and approved by Owner and Engineer. Temporary water bypass system is intended to maintain fire protection and water service impacted by the Project until permanent water service and fire protection is restored.

2. Provide public notification as required by the Owner.

3. Provide temporary valves, temporary hydrants, and tap hole connections, in accordance with the Drawings, or as modified by the Contractor and approved by the Owner and Engineer.

4. Provide fire service connections, including tap holes, and domestic service corporations, service hoses, including wye connections at hose bibbs, for each property requiring a temporary domestic and fire service. Close street side valve at meter after activating temporary domestic service connection.

5. Provide temporary hydrant for each Siamese connection.

6. Bury temporary bypass water system at roadway crossings, pedestrian ramps, driveway crossings and areas required by Owner or Engineer to protect the temporary bypass system from damage and maintain public safety.

7. Provide temporary and permanent hot-mix asphalt in accordance with MDOT Specifications for all temporary bypass water main system trenches.

B. Related Requirements

1. Section 33 01 10.58 Disinfection of Water Utility Piping Systems

2. Section 33 10 00 Water Distribution Piping, Valves and Fittings

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment Requirements: Per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American National Standards Institute (ANSI)

   a. ANSI/NSF 61 Drinking Water System Components – Health Effects

   b. ANSI/NSF 372 Drinking Water Components – Lead Content

2. American Water Works Association (AWWA)

   a. AWWA C651 Disinfecting Water Mains

   b. AWWA C800 Underground Service Line Valves and Fittings

   c. AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, ¾ In. (19 mm) Through 3 In. (76 mm), for Water Service

3. ASTM International (ASTM)

   a. ASTM A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

   b. ASTM A183 Standard Specification for Carbon Steel Track Bolts and Nuts

   c. ASTM A449 Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use

   d. ASTM A536 Standard Specification for Ductile Iron Castings

   e. ASTM B62 Standard Specification for Composition Bronze or Ounce Metal Castings

   f. ASTM B584 Standard Specification for Copper Alloy Sand Castings for General Applications

   g. ASTM D2737 Standard Specification for Polyethylene (PE) Plastic Tubing

   h. ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

   i. ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter

   j. ASTM F1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing

4. Factory Mutual (FM)

5. Underwriters Laboratories Inc. (UL)

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: In accordance with Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

1. Submit a plan and schedule of the proposed temporary water bypass system including any alterations, at least 14 days prior to beginning installation of the temporary water bypass system.

2. Minimum contents of the plan and schedule:

   a. Revisions to the temporary water bypass system shown on the Drawings including: connections to existing hydrants, taps to existing water mains and fire services, street crossings, existing valves to be operated, and location of temporary hydrants, temporary valves, and temporary water bypass sampling locations.

   b. Description of connection procedures for domestic services, details, and a description of installation procedures for tap hole connections to existing mains and fire services, including thrust restraint, and disinfection procedures.

   c. Daily schedule outlining the locations where temporary water mains will be installed and notification procedures for business owners and residents.

3. Emergency Contact List: To include name, address, home and mobile telephone numbers of at least 3 Contractor employed personnel, qualified to work on municipal water distribution systems and skilled in the operation, maintenance and repair of the temporary water bypass system in use.

   a. Each contact shall be knowledgeable of the temporary water bypass system in use, with specific knowledge of its operation and maintenance requirements and valve locations.

   b. Each contact shall be available 24 hours per day/ 7 days per week, and able to respond to emergency repair calls within a maximum of 2 hours.

4. Sample connection/disconnection written notice intended for distribution to property owners.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1.07 SITE CONDITIONS

A. Existing Conditions: Per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 TEMPORARY BYPASS WATER MAIN

A. Provide high-density polyethylene (HDPE) or galvanized steel pipe with watertight joints capable of withstanding whatever forces, including traffic loads, they will encounter.

1. Pipe:

   a. High-Density Polyethylene (HDPE) Pipe: Good condition; manufactured from high density, extra high molecular weight compound equaling a PE 3408 designation and conforming to ASTM D1248 and ASTM D3350, with a cell classification of 345434C; comply with ANSI/NSF 61 and ANSI/NSF 372.

   b. Other Pipe Materials: Not permitted for the temporary bypass water system.

2. Working Pressure: Minimum 200 psi.

3. Minimum Wall Thickness

Diameter	HDPE (in.)
12-inch	1.159
10-inch	0.977
8-inch	0.784
6-inch	0.602
4-inch	0.409
2-inch	0.216

4. Fittings and Couplings: Victaulic restrained joint design or Engineer-approved equal; ductile iron conforming to ASTM A536; comply with ANSI/NSF 61 and ANSI/NSF 372; designed to resist flexure and torsion loads; UL listed, FM approved; minimum 300 psi working pressure; EPDM gaskets; heat-treated, plated carbon steel, trackhead bolts and nuts complying with ASTM A449 and ASTM A183.

2.02 TEMPORARY WATER SERVICE CONNECTIONS

A. Temporary Water Service Connections: Minimum 3/4-inch polyethylene or rubber hose tubing complying with ANSI/NSF 61 and ANSI/NSF 372 and bearing the imprint of the National Sanitary Foundation approval for potable water (NSF-PW).

2.03 TEMPORARY HYDRANTS AND VALVES

A. Temporary Hydrants: Ductile iron conforming to ASTM A536; comply with ANSI/NSF 61 and ANSI/NSF 372; 4-1/2-inch pumper nozzle; acceptable to and supported by means approved by the local Fire Department to prevent deflection of the hydrant or bypass piping system when the hydrant is in operation.

B. Temporary Valves: Watertight, butterfly, rubber seat type; operating nut controlled by standard wrench; arrow indicating open direction.

PART 3 – EXECUTION

3.01 GENERAL

A. Provide temporary water bypass system as shown on the Drawings and as specified. Submit alterations to the temporary water bypass system in accordance with Article 1.05 prior to beginning any Work on the Project.

B. Provide temporary water bypass main, hydrants, in-line valves, domestic and fire service connections, tap holes, service blow backs and permanent gate valves prior to beginning water main construction.

C. Interruption of water service or fire protection is not permitted during water main construction or bypass installation/removal.

1. Connect temporary bypass water mains to the existing distribution system at both ends to maintain continuity in the distribution system. “Dead-ending” of the temporary water bypass system is not permitted.

2. Take necessary measures, including tapping existing water mains and installing gate valves when existing hydrants and existing gate valves are unavailable for use, to assure continuous water service and fire protection.

D. Provide, maintain, and remove service hoses of approved size, to service all consumers from gated connections on the bypass pipe.

E. Provide separate temporary service connections for each domestic and fire service. Directly connecting one building to another is prohibited.

F. Meet the following minimum requirements if temporary water bypass ystem is not shown on the Drawing.

1. Temporary Main: 6 inches unless otherwise approved in writing.

2. Domestic Service Main: minimum 2 inches in diameter.

3. Temporary Hydrants: Provide for each existing and proposed hydrant and at buildings with Siamese connection. Provide additional temporary hydrants when required by the local Fire Department at no additional cost to the Owner.

4. Temporary Valves: Provide watertight temporary valves at hydrant connections, tap hole connections, branch lines to provide 3-way control, and at 800 linear foot increments. Provide additional temporary gate valves when directed at no additional cost to the Owner.

5. Temporary Water Bypass Feeds: Connect fire protection main at each end to existing mains that will remain in service. Provide additional fire protection main connections, when directed, at no additional cost to Owner. Provide temporary valves at hydrant connections. Locate temporary valve after temporary hydrant to ensure temporary hydrant remains live when temporary valve is closed.

6. Temporary Service Connections

   a. Fire Service: Off fire protection main with minimum 4-inch connection.

   b. Domestic Service: Minimum 3/4-inch diameter as specified in Article 2.02.

G. Contact local Fire Department in writing upon installation of temporary water bypass system. Schedule site visit with District Chief to review system. Review District Chief comments with Engineer and make modifications required. Provide copy of notice to District Chief to Owner and Engineer.

H. Provide minimum inconvenience to property owners and water customers during connection and disconnection. Provide public notification as required by the Owner.

3.02 PIPING

A. Provide temporary bypass pipe and other materials with adequate water tightness. Exercise care throughout the installation of the temporary mains and service connections to avoid possible contamination of water mains or house services or contamination of the temporary bypass pipe itself. Flush, disinfect and test all temporary mains and services to prevent contamination in accordance with Section 33 01 10.58.

B. Lay temporary piping along the general lines of streets or roadways to cause minimum disruption and avoid damage. Unless otherwise directed by Owner, ramp 4-inch or smaller bypass piping with temporary bituminous pavement, cold patch,

or other approved material on each side of the pipe at driveways and sidewalks. Bury bypass piping greater than 4 inches in diameter at driveway and sidewalk crossings.

1. Take additional precautions to minimize public inconvenience in areas where bypass and/or service pipe or hoses may be considered an obstruction to safe passage, including installation of additional ramping on both sides of the bypass pipe or burying the bypass pipe at building walkway entrances, at sidewalk crossings, and in other areas where the piping is considered an obstruction to safe passage.

2. At roadway, sidewalk and driveway crossings, cut a narrow trench in the existing pavement sufficiently wide and deep enough to allow placement of the bypass pipe just below the roadway surface. Place temporary hot-mix asphalt patch in accordance with MDOT Specifications. Make flush with the adjacent pavement. Compaction of temporary surfacing by vehicular traffic is not allowed. Upon removal of the bypass piping, backfill trench with gravel material, properly compacted, and restore to service with a permanent hot-mix asphalt patch. Temporary and permanent pavement for bypass shall be considered incidental to the temporary water bypass bid items.

3.03 OPERATION AND MAINTENANCE

A. Maintain 24 hours per day, 7 days per week until the Work has been completed and the bypass system has been removed.

B. Complete sections of the Project in progress before the daily low temperature falls below 40 degrees Fahrenheit. Maintain all components of the bypass system impacted by freezing conditions, including service connections and take reasonable measures when scheduling Work as cold weather season approaches. Should it become necessary to stop Work and remove the bypass system due to freezing conditions, re-install, chlorinate, test, and return the temporary bypass system to service at no additional cost to the Owner.

3.04 REMOVAL

A. After the existing water mains have been replaced and new water mains put into service, remove components of the temporary bypass system immediately and perform hot-mix asphalt patching required for temporary lines.

END OF SECTION

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SECTION 10 14 00

SIGNAGE

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide interior and exterior signs and directories in accordance with this Section and applicable reference standards listed in Article 1.03.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment Requirements: Per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. Americans With Disabilities Act (ADA)

2. Maine Department of Transportation (Maine DOT) Utility Accommodation Rules

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: Per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with the Division 01 General Requirements.

B. The following shall be submitted in accordance with Division 01 General Requirements:

1. Shop Drawings

a. Provide large-scale Shop Drawings for fabrication, installation, and erection of all parts of the Work. Provide large-scale layout of sign wording, spacing, type size, and style. Provide Plans, elevations, and details of anchorages, connections, and accessory items. Provide installation templates for Work installed but others. Provide full size spacing templates for individual letters and numbers.

2. Submit manufacturer's product data, installation instructions, use limitations and recommendations for each material used.

3. Samples

a. Submit Samples showing complete range of colors, textures, and finishes available for each material used.

b. Submit representative Samples of each material that is to be exposed in the finished Work, showing the full range of color and finish variations expected. Provide Samples having a minimum area of 144 square inches.

4. Provide certification stating that materials comply with Regulations. Manufacturers shall have at least five years' experience in the manufacture of sign systems specified.

C. Closeout and Maintenance Material Submittals: Per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Signage shall comply with Americans with Disabilities Act (ADA) requirements, including Type 2 Braille.

C. Signage shall comply with Maine DOT requirements.

1.07 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Deliver materials and products in unopened factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and protect from damage. Sequence delivers to avoid delays but minimize on-site storage.

1.08 SITE CONDITIONS

A. Existing Conditions: Per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. For each type of material required for the Work of this Section, provide primary materials that are the products of one manufacturer. Provide secondary materials that are acceptable to the manufacturers of the primary materials.

1. Andco Industries
2. Cornelius
3. Gemini, Inc.
4. Lynn Sign Company
5. Mohawk Engraving Company
6. Stamprite Supersine
7. Engineer-Approved Equal

2.02 FABRICATION

A. Fabricate Work to be straight, plumb, level, and square with smooth flat surfaces and sharp corners, except where indicated otherwise. Precisely form Work to sizes, shapes, and profiles indicated on approved Shop Drawings. Fabricate metal Work with uniform, invisible joints.

2.03 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

2.04 ELECTRICAL HEAT TRACE SIGNS

A. Provide self-adhesive anodized aluminum electrical heat trace labels to the outside of the thermal insulation jacket on all exposed sections of the force main bridge crossing. Provide signage inside valve access manholes. Labeling shall indicate the presence of electrical heat tracing. Use one label for every 10 linear feet of pipe. Attach labels in locations for maximum visibility as directed by the Engineer.

B. Heat trace labels shall be designed in accordance with the following:

1. Signal Word: “Warning”
2. Word Message: “Electrical Heat Trace Cables Present. Disconnect Prior to Servicing”
3. Size: 4-inch wide by 2-inch high (minimum)
4. Corners: Square
5. Background Color: White
6. Lettering: Black

2.05 MDOT UTILITY IDENTIFICATION SIGNS

A. Provide utility identification signage at each end of the bridge crossing in accordance with Section 13.1.D of the Maine DOT Utility Accommodation Rules. Signs shall be 0.080 mm reflective aluminum specifically designed for outdoor installation. Signs shall include radius corners. Provide sign posts, anchorage footings, 316 stainless steel attachment hardware and all related appurtenances. Signs shall be designed in accordance with the following:

1. City of Brewer

   a. Line #1 (Authorized Entity): City of Brewer, ME

   b. Line #2 (Type of Attachment): Water

   c. Line #3 (Contact Telephone Number): Contact: 207-989-4214

   d. Background: White

   e. Lettering: Black

   f. Size: Size of signage to accommodate text required by Maine DOT. Minimum size shall be 24 inches high by 18 inches wide.

2.06 PIPE LABELS

A. All piping shall be labeled on 2 sides at maximum 15-foot intervals. A flow direction arrow shall follow the label legend and be of the same color. The labels shall meet or exceed ASME A13.1 and ANSI standards. The legend letters shall be capitalized and be black or white, depending on the background color. The labels shall be self-adhesive vinyl type. The labels shall be suitable for a pipe temperature range of minus 40 degrees F to 175 degrees F. Clip on or zip tied labels are not acceptable.

B. The pipes shall be labeled according to the fluid carried. The labels shall match the fluid designations as shown on the Drawings. Provide a detailed submittal, which shall include each pipe label for each of the respective fluid designations for review by the Engineer. Pipe labels shall be installed on the exterior of all piping insulation and jacket.

C. The piping labels shall spell out the entire fluid designation, not the abbreviation. Confirm the naming convention with the Engineer and Owner prior to ordering the labels. Color coding of labels shall be as approved by the Engineer.

D. All pipe labels of the same type, style, and duty shall be supplied by a single manufacturer. All pipe labels shall be a product of the following manufacturer:

1. MSI Marking Services, Inc.

2. Brimar Industries, Inc.

3. Engineer Approved Equal

PART 3 – EXECUTION

3.01 SEQUENCING AND SCHEDULING

A. Delay installation of Work in this Section until near time of Substantial Completion.

3.02 INSPECTION

A. The Installer shall examine substrates, supports, and conditions under which this Work is to be performed and notify Contractor, in writing, of conditions detrimental to the proper completion of the Work. Do not proceed with Work until unsatisfactory conditions are corrected. Beginning Work means installer accepts substrates and conditions

3.03 INSTALLATION

A. Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this Section. Install Work plumb, level, in true plane alignment. Provide signs and graphics where shown or schedule using mounting methods indicated.

3.04 TOLERANCES

A. The following allowable installed tolerances are allowable variations from locations and dimensions indicated by the Contract Document and shall not be added to the allowable tolerances indicated for other Work.

1. Allowable variation from true plumb, level and line: Plus, or minus 1/8 inch in 10 feet.

2. Allowable variation from true plane of adjusted surfaces: Plus, or minus 1/16 inch.

3.05 ADJUSTING, CLEANING AND PROTECTION

A. Adjust Work to present the best possible appearance. Touch-up damaged finishes and repair damage to eliminate evidence of repair. Clean exposed surfaces using materials and methods recommended by manufacturer of material or product being cleaned. Remove and replace Work that cannot be successfully repaired or cleaned.

B. Provide temporary protection to ensure Work being without damage or deterioration at time of final acceptance. Remove protections and re-clean as necessary immediately before final acceptance.

3.06 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.07 STARTUP & COMMISSIONING

A. Provide in accordance with Division 01 General Requirements.

3.08 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

SECTION 26 05 00

GENERAL ELECTRICAL

PART 1 – GENERAL

1.01 SCOPE

A. The Contractor shall provide the labor, tools, equipment, and materials necessary to furnish and install all electrical Work in accordance with the Contract Drawings and as specified herein.

B. In General, electrical Work shall include but not be limited to the following:

1. Secondary Electric Services
2. Coordination with Electric Utility Company
3. Power distribution equipment as indicated on the Drawings.
4. Power outlets and equipment connections.
5. Control Wiring
6. Grounding System
7. Underground Systems
8. Installation and connection of heat trace systems
9. All support material and hardware for raceway and electrical equipment.
10. Branch Circuit Wiring
11. Termination of all cable and wire unless otherwise noted.
12. Start up, acceptance testing test reports and instruction of systems operation to the Owner.

C. Secure and pay for all permits and certificates as required by local, State and Federal laws.

D. Coordinate all new electric service Work with the local utility company, Versant Power, and make all installations for their services in accordance with their requirements.

1. The Contractor shall be responsible for providing the secondary service entrance conduit and conductors from new and/or existing utility riser poles as indicated on the Contract Drawings.

2. All utility company back charges shall be the responsibility of the Contractor. Cost of electricity shall be borne by the Contractor until substantial completion as determined by the Owner and Engineer.

3. Contractor shall be responsible for establishing service requests with Versant Power for the service Work associated with this Project.

4. Provide and install all required conduit, wire, pull boxes, and accessory items to accomplish the Work involved in providing the new electrical services as shown on the Drawings. Services shall be wired for 120/240 volts, single phase, 3 wire, at 60 Hertz. Meter enclosure for the new services shall be as required by the local utility company. Coordinate all Work with the local utility for a complete installation.

E. All Work shall be in accordance with the latest issue of the National Electrical Code, NEC.

F. Furnish, install, and connect all equipment, switches, power, and outlets as indicated or required.

G. Furnish and install all required system and equipment grounds in accordance with the requirements of the National Electrical Code and additional grounding as indicated and specified.

H. Install new conduits and wiring as indicated and as specified herein.

I. Coordinate the installation of electrical items with the schedules for Work of other trades to prevent unnecessary delays in the total Work.

J. The Contractor shall visit the site prior to submitting a bid, and carefully examine existing conditions and difficulties that may affect the Work of this Section, and other applicable related sections. No extra payment will be allowed for additional Work caused by unfamiliarity with site conditions.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract and Division 1, General Requirements, apply to all the Work, including the Work of this Division. Examine all contract documents for requirements affecting the Work.

1.03 SHOP DRAWINGS

A. The Contractor shall, after award of Contract and before installation, submit Shop Drawings, Owner's Manuals and Operating Instructions for equipment to be furnished under this Contract. Shop Drawings shall be submitted for the following items (Shop Drawings are required prior to acceptance):

1. Distribution Equipment

2. Wiring materials and devices.

3. Submittals and shop drawings shall be provided for all proposed equipment, components, and accessories.

4. Shop drawings shall show overall dimensions, weight, mounting details, spacing requirements, and cooling requirements.

1.04 PROJECT CLOSE-OUT DOCUMENTATION

A. Safety: MSDS sheets received.

B. Instruction manuals shall be provided for all proposed equipment, components, and accessories.

1.05 RECORD DRAWINGS

A. The Contractor shall keep a marked set of Drawings at each site as a record set indicating all revisions in the Work as the Work progresses. At the completion of the Work, a set of reproducible Drawings marked "AS-BUILT DRAWINGS" with the Contractor's name and date shall be delivered to the Engineer.

1.06 JOB CONDITIONS

A. Existing Utilities: Locate existing underground utilities in excavation areas. If utilities are indicated to remain, support, and protect services during excavation operations.

B. Prior to all Work of this section, carefully inspect the installed Work of all other trades, and verify that all such Work is complete to the point where this installation may properly commence.

C. Verify that the electrical installation may be made in complete accordance with all pertinent codes and regulations and the original design.

PART 2 – PRODUCTS

2.01 WIRING MATERIALS

A. Unless indicated otherwise, all wiring shall be enclosed in approved raceways; all sized in accordance with code requirements for the conductors indicated. Minimum size shall be 3/4" except as noted. Underground conduits and conduits in poured concrete shall be 3/4" minimum size.

1. Rigid galvanized steel conduit shall be used for all exterior aboveground applications. Rigid steel conduit, including couplings, elbows, bends, and nipples, shall conform to the requirements of UL 6 and NEMA C80.1. Steel fittings shall be galvanized by the hot-dip process.

2. Exposed conduit, couplings, etc. for use under the bridges shall be PVC Coated, Rigid Galvanized Steel Conduit.

3. Fittings for rigid steel conduit shall be threaded and shall conform to NEMA FB 1. Gaskets shall be solid for fittings sized 1-1/2 inches and less. Conduit fittings with blank covers shall have gaskets except in clean, dry areas or at the lowest point of a conduit run where drainage is required. Covers shall have captive screws and be accessible after the Work has been completed.

4. PVC conduit shall be not lighter than Schedule 40, unless indicated otherwise. Rigid PVC shall be the slip-joint solvent-weld type, and fittings shall be unthreaded solid PVC. Conduit and fittings shall conform to UL 651 and NEMA TC 3.

5. Use Schedule 40 PVC conduit for exterior direct buried installations and for exterior concrete encased installations. The transition from concrete encasement and underground to riser shall be rigid galvanized steel conduit. All elbows used in PVC conduit runs shall be prefabricated rigid galvanized steel to prevent wire "burn-through".

6. Where flexible permanent connections are required, provide flexible liquid-tight Type UA conduit, using approved liquid-tight fittings. Liquidtight flexible metallic conduit shall be provided with a protective jacket of PVC extruded over a flexible interlocked galvanized steel core to protect wiring against moisture, oil, chemicals, and corrosive fumes.

7. All conduits shall be substantially supported with approved stainless-steel clips or hangers. Provide and install supporting racks of stainless-steel channel for parallel runs of conduit.

8. All supporting materials for exterior use and for use under the bridges shall be 304 Stainless Steel and all hardware shall be minimum 316 stainless steel.

B. Wiring shall be copper conductors with THHN/THWN or XHHW insulation rated for 600 – volts, except as noted. Wiring #14 AWG and larger shall be stranded. All wiring shall be UL labeled and indicate manufacturer's name, type, and size.

1. Sizes shall be no less than indicated. Branch circuit conductors shall be no smaller than No. 12 AWG. Conductors serving 120-volt branch circuits that are more than 100 feet long from panel to load shall be No. 10 AWG.

2. Feeder conductors from main service, and where elsewhere specified, shall be Type XHHW insulated for 600 volts.

3. Control and Instrumentation wiring, including digital/discrete signal wiring, shall be minimum #14 AWG, copper stranded, 600 volt rated insulation unless specifically indicated otherwise.

4. Control and Instrumentation wiring for analog signals (4-20mA DC) shall be shielded, 2-conductor, minimum #18 AWG, Belden No. 8760, or equal.

C. All exposed wiring shall have threaded cast "Condulet" type fittings. Fitting and boxes for exterior installation shall be weatherproofed.

D. In general, junction boxes shall be provided with associated covers and fittings and shall have an approved NEMA rating for each location installed. Box bodies shall be provided with integral threaded conduit openings, as required. Mounting lugs shall be provided at the back or at the bottom corner of the box body. Covers shall be secured to box bodies with AWG No. 6 or larger stainless steel flathead screws. Where required, boxes shall be provided with neoprene cover gaskets that will prevent the entrance of water into the enclosure.

1. Pull boxes shall be installed where indicated or required in accordance with NEC. Boxes shall be of adequate size for all conductors installed therein and shall have either screw type or hinged flush covers as required.

2. Use corrosion resistance watertight boxes (NEMA 4X) for all exterior locations, unless indicated otherwise. Provide gasketed covers and accessories by box manufacturer for complete weatherproofing. Provide correct box to accept weatherproof covers as specified.

3. All boxes shall be rigidly supported as approved.

4. Conduit Connections: When conduit is joined to a non-threaded or hubless NEMA 1 or NEMA 1A box or enclosure, it shall be joined by means of two locknuts and insulated or grounding bushing, as required. When conduit is joined to a non-threaded or hubless NEMA 12 or watertight box or enclosure, it shall be joined by means of Myers "Scru-Tite," or equal hubs.

5. Conduits and sleeves penetrating fire rated barriers shall be sealed and/or filled with approved material to maintain the fire rating.

2.02 WIRING DEVICES

A. Wiring devices shall be as manufactured by Hubbell, except as otherwise noted. Devices having equivalent details and matching interchangeable characteristics as manufactured by Pass & Seymour or Leviton spec-grade may be used subject to submittal and approval of Shop Drawings.

2.03 GROUNDING SYSTEM

A. Provide and install 600 volt insulated bonding conductors throughout the distribution system with connection to bonding (or grounding) terminal on each panel and panelboard and with connections to other equipment where specifically indicated and noted.

B. Provide and install bonding conductor to each item of electrical equipment.

C. Ground main service entrance panelboard ground bus or lug to neutral of incoming service, to enclosure, to building steel, to rebar in concrete footing, and to main cold-water pipe. Install grounding bushings or service conduits. Use exothermic style ground connections to the ground rods and building steel.

D. Bonding conductors shall be continuous where possible. Where splices are required, provide T & B, or approved equal, compression connectors of approved pattern. Insulate connectors to equivalent thickness of conductors.

E. Ground rods; Solid copper clad, 3/4-inch diameter by 10 feet long.

F. Insulated conductors: Green in color.

G. Bonding Strap Conductor/Connectors. Soft copper, 0.05-inch-thick and 2 inches wide, except as indicated.

H. Pressure Connectors. High conductivity plated units.

I. Bolted Clamps. Heavy-duty units listed for the application.

J. Exothermic Welded Connections. Provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

PART 3 – EXECUTION

3.01 WORKMANSHIP & INSTALLATION

A. All Work shall be in accordance with the National Electrical Code requirements as amended to date with the local electric utility company's rules, the Fire Underwriter's requirements and all local, State and Federal laws and regulations. All equipment shall be Underwriters listed (UL).

B. The drawings indicate the extent and the general location and arrangement of equipment, conduit, and wiring. The Contractor shall become familiar with all details of the Work and verify all dimensions in the field so that the outlets and equipment will be properly located and readily accessible. If any conflicts occur necessitating departures from the drawings, details of and reasons for departures shall be submitted and approved prior to implementing any change.

C. The location of conduits, outlets, equipment, etc., as shown shall be considered as approximate only. The Contractor shall field verify all existing conditions prior to installation of all new equipment.

D. All splices shall be mechanically and electrically perfect, using approved solderless wire connectors. Splices shall be insulated equivalent to insulation on conductors.

E. All equipment shall be in first-class condition at time of delivery of building to Owners with all scratches, mars, etc., refinished to factory standards.

F. Installation of Conduit

1. Install exposed conduits, parallel or perpendicular to walls, ceilings, or structural members. Do not run through structural members. Avoid horizontal runs within partitions or sidewalls.

2. Conduits shall be of sizes required by the National Electrical Code increased to include bonding conductor as specified. No wire shall be installed until Work which might cause damage to wire or conduits has been completed. Conduits shall be thoroughly cleaned of water or other foreign matter before wire is installed.

3. Conduits shall be fastened by suitable stainless-steel clips or approved hangers. Clips and boxes shall be fastened by wood screws on wooden surfaces, machine screws on metal, toggle bolts in masonry block, or by expansion shields in concrete. Parallel runs of conduit shall be neatly clustered with all bends and offsets of uniform pattern.

4. Do not run conduits exposed on the exterior surface of buildings. Conduits penetrating exterior walls below grade, at grade floors, or below grade floors shall be sealed to prevent moisture migration. The exterior of the conduit shall be sealed with a mechanical pipe seal. The interior conduit seal shall be a gland type sealing bushing or RTV closed cell silicone foam. Ensure that conduits do not retain water against these seals.

5. All elbows in nonmetallic conduit runs shall be rigid galvanized steel to eliminate “burn through” when pulling in conductors.

6. All empty conduits shall have nylon pull rope or min. #10AWG wire installed and labeled.

G. Installation of Wiring

1. Raceways must be completely installed, with interiors protected from the weather, before proceeding with the installation of wires and cables. Conductors of special-service systems and emergency light and power systems must not occupy the same enclosure with light and power conductors or the same enclosure with each other. Conductors must be continuous with splices and connections made in outlet, junction, or pull boxes only. All control wiring must be continuous between components and/or terminal boards.

2. Phase conductors and the neutral conductor of each branch or feeder circuit must be contained in a single enclosure or paralleled in separate enclosures to avoid overheating the raceway by electromagnetic induction. Conductors

and conduit in parallel must be the same length and size, must have conductors of the same type of insulation, must be terminated at both ends in a manner to ensure equal division of the total current among conductors, and must have a separate neutral conductor in each conduit.

3. Sharing of a common neutral between single phase circuits, connected to different phases, shall not be permitted.

4. All circuit conductors of the same color shall be connected to the same ungrounded feeder conductor throughout the installation. Conductors of different voltage system shall not enter same raceway systems.

5. Conductors installed in heavy-wall rigid steel conduit and shall have allowable current-carrying capacity and ampere ratings in accordance with NFPA 70. Larger-sized conductors shall be used to compensate for derating factors when more than three current-carrying conductors are installed in raceways and when conductors are installed in wet locations.

6. In general, wiring for the following systems shall be run in separate conduits. Do not mix categories in a single raceway. Note that 24-volt DC digital and analog control wiring may be combined in single raceways.

   a. 120-volt power wiring.

   b. 120-volt control wiring, including, digital input and output signals.

   c. 24-volt DC control wiring, including, digital input and output signals.

   d. 24-volt DC analog control wiring (4-20mA).

   e. Communications wiring.

   f. Special Systems.

7. Conductors 600 volts and below must be color coded in accordance with the Table below. Where conductors are not available in the colors indicated, due to size or other reason, the Contractor shall install identifying adhesive bands ¾" wide of colors indicated below around each conductor within six inches and twelve inches of each end and at a maximum of five-foot intervals along wireways, at back of panelboards, etc., where conductors are accessible.

CONDUCTOR	120 / 208 COLOR	480 / 277 COLOR
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	White / Gray
Equipment Grounds	Green	Green

8. The entire electrical system shall be permanently and effectively grounded in accordance with Code requirements.

3.02 IDENTIFICATION

A. Provide laminated plastic nameplates for equipment, panels, enclosure, relay, switch, and device. Each nameplate inscription shall identify the name of the equipment, function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125-inch-thick, white with black center core. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25-inch-high normal block style.

B. Provide arc flash labels for all electrical equipment with operating voltages greater than 50 volt per NEC 110.16.

C. Provide exterior warning signs where required. Warning and caution signs shall be weather resistant, nonfading, preprinted cellulose acetate butyrate signs with 20-gauge, galvanized steel backing, with colors, legend, and size appropriate to the location.

D. Provide tags on each end of all pull wires, all intercommunication wires, etc., giving location of other end. Wire labels for wires smaller than No. 4. shall be vinyl or vinyl cloth, self-adhesive, wraparound, wire markers with preprinted numbers and letters. Wire sizes No. 4 and larger and multi conductor cables shall be marked with one-piece, nylon locking marker ties equal to Panduit PLM Series.

E. Install underground line marking tape where required and as indicated. Underground line marking tape shall be permanent, bright colored, continuous printed, metal backed, plastic tape compounded for direct burial service not less than 6 inches wide. Printed legend indicative of general type of underground line below.

3.03 TESTING AND ADJUSTING

A. The entire installation shall be free from short circuits and improper grounds. Tests shall be made in the presence of the Engineers or their representatives. Each panel shall be tested with mains disconnected from the feeder, branches connected, and switches closed, all fixtures in place and permanently connected, lamps removed or omitted from the sockets, and all wall switches closed.

B. The contractor shall test by Megger Test, the Insulation-Resistance on each field-installed conductor with respect to ground and adjacent conductors. Applied potential must be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Take readings after 1 minute and until the reading is constant for 15 seconds. Minimum insulation-resistance values must not be less than 25 Megohms for 300 volt rated cable and 100 Megohms for 600 volt rated cable. For

circuits with conductor sizes 8AWG and smaller insulation resistance testing is not required. Megger Tests shall be witnessed by the Engineer. A minimum of two weeks' notice shall be given to the Engineer prior to scheduling the megger tests.

C. Final acceptance of the equipment and/or workmanship will depend upon performance characteristics as determined by the subject tests, in addition to complete operation tests, on all electrical equipment to show that it will perform the functions for which it was designed.

D. If the test and inspection data submitted should indicate deficiencies in the operation of the electrical apparatus or in the manufacturer thereof, the CONTRACTOR shall promptly implement the necessary adjustments, corrections, modifications and/or replacements necessary to be made to meet the specified requirements.

3.04 CONTINUITY OF SERVICE AND SCHEDULE OF WORK

A. The Contractor shall arrange to execute the Work at such times and in such locations as may be required to provide uninterrupted services for the building or any of its sections. If necessary, temporary Work shall be installed to provide for this condition. Authorization for interrupting service shall be obtained in writing, from the Owner. Costs for overtime Work and temporary Work shall be included in the bid.

END OF SECTION

SECTION 31 20 00

EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY OF WORK

A. Provide all excavation, filling, back filling, removal of materials, surface repair and related appurtenances for the Work as specified and as indicated on the Drawings. Earthwork for utilities is included in this Section.

1.02 REFERENCES

A. Maine Department of Transportation (MaineDOT)

1. Standard Specifications November 2014 Edition

B. National Fire Protection Association (NFPA)

1. NFPA 495 Code for the Manufacturer, Transportation, Storage, and Use of Explosive Materials

1.03 SUBMITTALS

A. The following shall be submitted in accordance with Division 01 General Requirements. All submittals shall have pertinent numerical data and information specified in the "English" language using "English" units. The submittals shall include but are not limited to the following in addition to Division 01 General Requirements.

B. Test Reports

1. Provide test reports for all materials which are used as part of the Work. Include material gradations from a certified testing laboratory for all materials.

2. Provide field compaction testing results for fill areas, paved subgrade areas, utility trenches, etc. as specified and as directed by the Engineer for an independent testing laboratory.

1.04 REGULATORY REQUIREMENTS

A. Conform to applicable codes and NFPA 495 for explosive disintegration of rock.

B. Obtain permits from authorities having jurisdiction before explosives are brought to the project site or drilling is started.

1.05 PROTECTION

A. Do not operate equipment on paved surfaces which will cause damage.

B. Maintain excavations with approved barricades, lights, and signs to protect life and property until excavation is filled and graded to a condition acceptable to the Engineer.

C. Protect structures, utilities, sidewalks, pavement, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.06 EXISTING SITE CONDITIONS

A. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. Data is made available for convenience of Contractor. Additional test borings and other exploratory operations may be made by Contractor at no cost to the Owner.

B. Demolish and completely remove from the site, all existing underground utilities indicated to be demolished or removed. Provide services of utility companies for shut-off of utilities, services and related systems if lines are active.

C. Provide test pits where shown on the Drawings or as directed by the Engineer. Comply with all requirements of this Section and the Contract Documents.

D. The use of explosives is permitted but requires written authorization from the Engineer.

PART 2 – PRODUCTS

2.01 GENERAL

A. Suitable Materials: Suitable materials shall be as shown on the Drawings or as specified.

B. Unsuitable Materials: Material containing excessive plastic clay, vegetation, organic matter, debris, pavement, stones or boulders over 6 inches in greatest dimension, frozen material, concrete, pavement, CMU, demolition debris and material which, according to the Engineer, will not provide a suitable foundation or subgrade.

C. On-Site Material: Any suitable material from on-site excavation.

D. Material for embankments and general fills may contain pieces of excavated ledge having a greatest dimension of up to 6 inches if approved by the Engineer.

E. Inspection: The Engineer may inspect off-site sources of materials and order tests of these materials to verify compliance with these Specifications.

2.02 AGGREGATE BASE – TYPE A

A. Hard durable gravel containing only particles passing the 2-inch sieve. All material shall meet MaineDOT "Standard Specification" Section 703.06, Type A aggregate.

2.03 AGGREGATE BASE – TYPE C

A. Hard durable gravel containing only particles passing the 4-inch sieve. All material shall meet MaineDOT "Standard Specification" Section 703.06, Type C aggregate.

2.04 AGGREGATE SUBBASE (GRAVEL)

A. Hard, durable stone with coarse to fine sand. All particles shall pass the 6-inch sieve and meet MaineDOT "Standard Specification" Section 703.06, Type D aggregate.

2.05 SAND

A. All material shall meet MaineDOT "Standard Specification" Section 703.22, Underdrain Backfill Material, Type B.

2.06 3/4-INCH CRUSHED STONE

A. Durable, clean angular rock fragments obtained by breaking and crushing rock material. All material shall meet MaineDOT Standard Specification Section 703.13, Crushed Stone ¾-Inch.

2.07 REFILL MATERIAL

A. Provide 3/4-inch Crushed Stone for refilling excavation below grade or rock excavation unless otherwise directed by the Engineer.

2.08 COMMON BORROW

A. Earth suitable for embankment construction free from frozen material, perishable rubble, peat and other unsuitable material. All material shall meet MaineDOT Standard Specification Section 703.18, Common Borrow.

2.09 MOISTURE CONTENT

A. Moisture content shall be sufficient to provide required compaction and stable embankment but not exceeding 4% above optimum as determined using AASHTO T180, method C or D.

2.10 SELECT BACKFILL

A. Use Aggregate Base – Type C as specified above.

2.11 RIP RAP

A. Unless otherwise specified, all material shall meet MaineDOT Standard Specification Section 703.26, Plain and Hand Laid Riprap.

B. Heavy Rip Rap: All material shall meet MaineDOT Standard Specification Section 703.28, Heavy Riprap.

2.12 SEPARATION GEOTEXTILE

A. Provide materials in accordance with MDOT "Standard Specification," Section 722.01, Separation Geotextile.

2.13 POLYETHYLENE LINER

A. Provide a U.V. Resistant liner with a minimum thickness of 6 mils.

PART 3 – EXECUTION

3.01 GENERAL

A. Remove all materials encountered to the limits shown on the Drawings or designated in the Specifications.

B. Do not perform rock excavation or excavation of unsuitable materials until material to be excavated has been cross-sectioned and classified by the Engineer. Predrilling and blasting of bedrock through overburden will not be allowed. However, if this method is used, the rock excavation quantities will be adjusted downward in proportion to the ground swell from this blasting method.

3.02 EARTH EXCAVATION

A. Removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, and other materials encountered that are not classified as rock excavation or unauthorized excavation.

3.03 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 ft. and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just

before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other Work.

3.04 ROCK EXCAVATION

A. Removal and disposal of materials that cannot be excavated without drilling and blasting, or requiring use of special equipment, except such materials that are classified as earth excavation.

1. Typical materials classified as rock are solid rock, rock in ledges, and rock hard cementitious aggregate deposits.

2. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

3. Rock excavation shall not include removal of material which can be removed with a hand pick or power shovel or loose or previously blasted rock or broken stone in rock fills or elsewhere.

B. Rock excavation payment limits shall be in accordance with the following unless otherwise specified or indicated on the Drawings:

1. Two feet outside of concrete Work for which forms are required, except footings and base slabs.

2. Manholes and Precast Concrete Structures: As shown on the Drawings for manholes and precast structures.

3. Pipe and Utility Trenches: As shown on the drawings for piping, utilities including pipe and bedding materials.

4. Concrete Work (No Forms): Neat outside dimensions of concrete Work where no forms are required.

5. Slabs on Grade: 6 inches below bottom of concrete slabs unless otherwise specified or as shown on the Drawings.

3.05 EXCAVATION IN PAVED AREAS

A. Saw cut pavement prior to excavation to provide a clean, uniform edge. Minimize disturbance of remaining pavement. Cut and remove the minimum amount of pavement required to do the Work. Use shoring and bracing where sides of excavation will not stand without undermining pavement.

3.06 EXCAVATION FOR TRENCHES

A. Produce an evenly graded flat trench bottom at the subgrade elevation required for installation of pipe and bedding material. Load excavated material directly into trucks unless otherwise permitted by the Engineer. Place backfill material directly into trench or excavation. Do not stockpile material to be used as backfill in roadways or along edges of trenches.

3.07 UNAUTHORIZED EXCAVATION

A. Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as all remedial Work directed by the Engineer including refilling, shall be at the Contractor's expense.

3.08 REFILLING UNAUTHORIZED EXCAVATIONS

A. Trenches: Use crushed stone or gravel as directed by Engineer.

B. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the Engineer.

3.09 EXCAVATION OF UNSUITABLE MATERIALS

A. When excavation has reached required subgrade elevations, notify the Engineer who will inspect conditions. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper as directed by the Engineer and replace excavated material with select backfill.

3.10 MATERIAL STORAGE

A. Stockpile and maintain suitable surplus excavated materials for re-use as backfill anywhere within the Project limits as directed by the Engineer. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations.

3.11 BLASTING

A. Refer to Specification 31 71 16 Controlled Blasting for additional details and requirements.

3.12 STABILITY OF EXCAVATIONS

A. General: Slope sides of excavations to comply with OSHA Regulations and Local Codes. Shore and brace where sloping is not possible due to space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

B. Refer to Specification 31 40 00 Shoring and Bracing for additional shoring and bracing requirements.

3.13 DEWATERING

A. Dewatering shall be incidental to the utility bid item.

3.14 RIPRAP PLACEMENT

A. Place required rip-rap to full depth shown on the Drawings in one operation without special handwork. Depth shall be measured perpendicular to the face of the slope to obtain a uniform appearance true to line and grade. Place larger stones at bottom of slope. Place stones in close contact, with interlocking of face stones and backing stones. Fill openings between stones with smaller rocks or coarse gravel.

3.15 BACKFILL AND FILL

A. General: Place acceptable soil material in layers to required elevations as shown on the Drawings and as listed below. Fill, backfill, and compact to produce minimum subsequent settlement of the material and provide adequate support for the surface treatment or structure to be placed on the material. Place material in approximately horizontal layers of beginning at lowest area to be filled. Do not impair drainage.

B. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Scarify surfaces so that fill material will bond with existing surface. When existing ground surface has a density less than that specified under "Compaction" for area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

C. Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

D. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

E. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately same elevation in each lift.

F. Do not allow heavy machinery within 5 feet of structures during backfilling and compacting.

G. Backfill excavations as promptly as Work permits, but not until completion of the following:

1. Acceptance of construction of below grade finishes including but not limited to, damp proofing, waterproofing, perimeter insulation, pipe insulation, insulation jacket, etc.

2. Inspection and recording locations of underground utilities.

3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities or leave in place if approved by the Engineer.

5. Removal of trash and debris.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

7. Backfill cast-in-place concrete structures when the concrete has developed adequate strength.

8. Use care in backfilling to avoid damage or displacement of underground structures and pipe.

9. Backfill under all existing utility pipes crossed by sewer construction with 3/4-inch crushed stone. The crushed stone back- fill will extend continuously from the bedding of the new sewer to the utility pipe crossed, including a 6-inch thick envelope of crushed stone all around the existing utility pipes.

10. The 3/4-inch crushed stone backfill shall stand at its own angle of repose. No "haunching" or "forming" with common fill will be allowed.

H. Backfilling of Trenches shall be in accordance with the trench details on the Drawings. Bed pipe in accordance with details on the Drawings and as specified for the applicable type of pipe. Limits of bedding and requirements for remaining trench backfill shall be as described in the applicable pipe specification or as indicated on the Drawings.

I. Trenches in cross-country runs shall receive surface restoration to existing conditions prior to construction unless otherwise specified or indicated on the Drawings. Mound trench 6 inches above existing grade if required by the Engineer.

J. Replacement of unsuitable materials shall be as previously specified for below normal grade conditions. In above normal grade conditions, replace unsuitable material with suitable stored onsite material. All excess suitable on-site material shall be used before additional off-site material is used. If additional material is required, provide Select Backfill.

3.16 COMPACTION

A. Methods: Utilize methods which produce the required degree of compaction throughout the entire depth of material placed without damage to new or existing facilities and which are approved by the Engineer. Adjust moisture content of soil as required. Remove and replace material which is too wet to compact to required density. Compact each horizontal layer of till and slopes as Work progresses.

B. Degree of Compaction: Compact to the following minimum densities unless otherwise specified or indicated on the Drawings:

Fill and Backfill Location	Density (% of maximum, see below)
Under structure foundations	95%
2 feet under pavement and above	95%
2 feet under pavement and below	92%
Trenches through unpaved areas	90%
Embankments (including slopes)	90%
Pipe bedding	92%
Beside structure walls, foundation walls, retaining walls, tank walls	90%
Under pipes through structure fills	90%

1. Maximum Density: ASTM D1557, modified.

2. Field Density Tests: ASTM D1556 (sand cone) or ASTM D2167 (rubber balloon), or ASTM D2922 (nuclear methods).

3.17 DENSITY TESTING

A. Determine actual in place densities using field tests as directed by the Engineer. Tests shall be made by an independent laboratory. Perform additional Work to obtain proper compaction if in-place densities do not meet the specified densities. Retesting may be required by the Engineer and shall be at no additional cost to the Owner.

B. The Minimum Number of Tests shall be in accordance with the following criteria:

1. Paved Areas and Building Subgrade: Provide at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case less than 3 tests.

2. Other Fill Areas: In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests per fill area.

3. Pipe Trenches: At least one test per 100 linear feet of trench per fill layer.

3.18 GRADING

A. Grading: Provide uniform grading of areas within limits as specified or as indicated on the Drawings, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Structure Lines: Grade areas adjacent to structure lines to drain away from structures and to prevent ponding.

C. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 ft. above or below required subgrade elevations.

2. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2 inch above or below required subgrade elevation.

3. Fill Under Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 10-foot straightedge.

D. Compaction: After grading, compact subgrade surfaces to the percentage of maximum density for each area classification.

3.19 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

3.20 DISPOSAL OF EXCESS MATERIALS

A. Remove excess excavated material and dispose of it in approved spoils areas. Provide removal and disposal of all excess material from the project site.

B. Grade material to the satisfaction of the Engineer and Owner of the property on which the material is deposited.

C. Keep roads free of debris. Use suitable watertight vehicles for hauling wet materials over roads and streets. Clean up materials dropped from or spread by vehicles promptly or when directed by the Engineer.

END OF SECTION

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SECTION 31 40 00

SHORING AND BRACING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Provide shoring and bracing to protect existing buildings, utilities, structures, and other improvements. Provide shoring and bracing to prevent excavations against caving due to unstable soils. Provide shoring and bracing in accordance with OSHA safety requirements of shoring and bracing. Provide measures to dispose of water in excavations accordance with all local, state, and federal regulations. Provide removal and disposal of all shoring and bracing unless otherwise specified or indicated on the Drawings.

B. Shoring and bracing systems include, but are not limited to, movable boxes and sheet piling. Provide movable box systems where a shoring system is required but sheet piling is not called for. Provide sheet piling where a shoring system is required but a moveable box is not sufficient.

1.02 RELATED WORK

A. Section 31 20 00 Earthwork

1.03 SUBMITTALS

A. The following shall be submitted in accordance with Division 01 General Requirements. All submittals shall be in the "English" language with "English" dimensions and units as required. The submittals shall also include but are not limited to the following:

B. Certificates

1. Provide design and submit shoring and bracing systems sealed by a registered professional Engineer in the state of the project location.

2. Submit certification indicating trench box application recommendations and applications for each trench box. Certifications shall be either sealed by a Professional Engineer registered in the state of the project location or shall be provided by the trench box manufacturer.

1.04 QUALITY ASSURANCE

A. Design of shoring and bracing systems shall be provided by a registered Professional Engineer in State of Maine. Design of shoring and bracing systems shall comply with local codes and OSHA requirements.

1.05 SITE CONDITIONS

A. Before starting Work, check and verify governing dimensions and elevations. Survey condition of adjoining properties, structures, utilities, etc. with the Engineer. Take photographs, recording any prior settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by the Contractor, Engineer and others conducting the investigation.

B. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations sufficiently distant so as not to be affected by excavation operations.

C. During excavation, resurvey benchmarks weekly, employing a licensed Land Surveyor or registered Professional Engineer in the State of Maine. Maintain accurate log of surveyed elevations for comparison with original elevations. Notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General: Provide suitable shoring and bracing materials which will support loads imposed. Materials need not be new but should be in serviceable condition.

B. Steel sheet piling and shapes (corners, etc.) shall be continuous interlocking type. Provide section modules and type of sections as required by design.

C. Bracing members shall be wood timbers or A36 steel members.

D. Bolts shall be in accordance with ASTM A307.

PART 3 – EXECUTION

3.01 GENERAL

A. Provide shoring and bracing systems to resist earth and hydrostatic pressures, including surcharges from surface loads and construction equipment.

B. Locate shoring and bracing to clear permanent construction and to permit forming and finishing of concrete.

C. Maintain shoring and bracing while excavation is open.

D. Remove systems in stages to prevent disturbance of soils and damage to structures and improvements. Fill voids as soon as sheeting is withdrawn.

3.02 STEEL SHEET PILING AND BRACING

A. Drive sheet piling prior to excavation where possible. Fill and compact voids outside sheeting to hold sides of excavation in place.

B. Brace as required to prevent distortion of piling and other bracing members. If necessary, to move a brace, install new bracing prior to removal of original brace.

C. Cut off sheet piling to be left in place at least two feet below finish grade.

END OF SECTION

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SECTION 33 01 10.58

DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide disinfection of water utility piping systems in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Related Requirements

1. Section 33 10 00 Water Distribution Piping, Valves and Fittings

1.02 REFERENCES

A. Reference Standards

1. American Water Works Association (AWWA)
   a. AWWA B300 Hypochlorites
   b. AWWA C651 Disinfecting Water Mains
   c. AWWA C655 Field Dechlorination
2. NSF International (NSF)
   a. NSF/ANSI 60 Drinking Water Treatment Chemicals – Health Effects
   b. NSF/ANSI 61 Drinking Water System Components – Health Effects

1.03 ADMINISTRATIVE REQUIREMENTS

A. Perform disinfection after completing preliminary flushing of water utility piping systems, and after pressure and leakage testing of water utility piping systems are complete and approved by Engineer.

B. Coordinate final flushing with Owner.

1.04 SUBMITTALS

A. Product Data: Safety Data Sheets (SDS)

B. Certificates

1. Certificate of compliance verifying independent commercial laboratory performing bacteriological sampling analyses is certified with the State Department of Environmental Protection for analyzing public drinking water supplies.

2. Certified bacteriological test results.

C. Source and Field Quality Control Submittals

1. Disinfection procedures, including flushing locations, rates of flushing, discharge locations, chlorine form, method of chlorination, procedures for measuring potable water supply, procedures for measuring free chlorine residual, sampling locations and number and frequency of samples for bacteriological tests.

2. Dechlorination Plan

3. Free chlorine residual test results.

D. Qualification Statements: Names and qualifications of personnel or firm performing disinfection and dechlorination Work.

E. Closeout and Maintenance Material Submittals: Per Division 01 General Requirements.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Trained personnel or firm with minimum 5 years' experience with disinfection and dechlorination of water utility piping systems.

B. Regulatory Approvals

1. Chemicals in contact with raw or drinking water meet NSF 60 Drinking Water Treatment Chemicals – Health Effects.

2. Products in contact with raw or drinking water meet NSF 61 Drinking Water System Components – Health Effects.

C. Independent Testing: Bacteriological analyses by an independent commercial laboratory certified by the State Department of Health and Human Services Center for Disease Control and Prevention Division of Environmental Health Drinking Water Program for analyzing public drinking water supply samples and the required testing parameters.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Chlorine: Liquid sodium hypochlorite or granular calcium hypochlorite conforming to AWWA B300.

PART 3 – EXECUTION

3.01 DISINFECTION

A. Disinfect new water utility piping systems utilizing continuous-feed method in accordance with AWWA C651 before being placed into service. The tablet method is not an approved disinfection method.

B. Utilize potable water from existing distribution system or other sources of supply approved by Owner.

C. Prevent contaminated or highly chlorinated water from entering existing, new or previously disinfected water utility piping systems.

D. Provide chemical feed pumps for chlorine solutions to provide accurate measurement of chlorine being introduced.

E. Contractors may wish to install additional chlorination taps and blowoffs to allow for release of distinct sections of water main.

F. Provide sampling taps in accordance with AWWA C651 at each end of installed piping, at a maximum 1,000-foot interval, and as approved by Owner.

1. Sample taps must have provisions to be accessed above grade for flushing and sampling. Adequate valving must be in place to allow high flows for flushing to achieve scouring velocity and turn the flow down to a steady stream so that samples may be taken. The ends of the taps shall be a minimum of 24” above grade and closed with rubber caps.

G. Sample sets are defined as all samples taken along the length of the project in distinct sections. Any samples with a chlorine residual greater than 4.0 mg/L will be rejected. Passing samples must be consecutive.

H. If hydrants are used as mainline sampling ports, any failed tests will be interpreted as indicative of mainline conditions.

I. A failed sample on any section of pipe shall cause all connected water mains and appurtenances to fail that round of sampling as well, unless they were isolated, and have remained isolated, by a closed valve prior to collecting the first round of samples.

J. Hydrants that are not used as mainline sampling ports, but are isolated and chlorinated separately, will require only one passing sample.

K. Swabbing will not be considered sufficient chlorination for any section of water main over 18 feet in length.

L. Disinfect final connections to existing mains in accordance with AWWA C651.

3.02 FINAL FLUSHING

A. Flush new water utility piping systems in accordance with AWWA C651 following a minimum 24-hour disinfection retention period with a free chlorine residual of not less than 10 mg/l. Prevent contaminated or highly chlorinated water from entering existing, new or previously disinfected piping systems.

B. Flush using water from existing main. Coordinate flushing with Owner and take necessary measures to prevent damage or flooding. Provide the following minimum flow.

4-inch diameter	120 GPM
6-inch diameter	260 GPM
8-inch diameter	470 GPM
12-inch diameter	1,060 GPM
16-inch diameter	1,880 GPM

3.03 DECHLORAMINATION AND DECHLORINATION

A. Neutralize chlorine residual of disposed flushing water by chemical dechlorination in accordance with AWWA C655. Provide equipment to dechlorinate at flushing rates indicated.

B. Comply with Federal, State, and local regulations for disposal of flushing water.

C. All water discharged from the system, whether it is normal system water used for flushing, water drained from standpipes, or super-chlorinated water used for disinfecting materials is expected to contain chloramines or chlorine. In some cases, with permission of local wastewater facilities or sewer departments, water discharged for these purposes may be able to be directed to a combined or sanitary sewer manhole. In the event that this is not permissible, all water that exits the distribution system shall be dechlorinated by a method appropriate for the amount of concentration known or suspected to be present and the volume of flow anticipated as soon as practicable upon being released. In no case shall water from the distribution system be discharged directly to a receiving water.

D. Acceptable methods of dechloramination or dechlorination include the following:

1. For very low concentrations, direct flow over long stretches of paved or grassy surfaces to allow dissipation prior to reaching a catch basin or receiving water. Sprinkle ascorbic acid in the discharge stream area as necessary to neutralize the disinfectant. Do not allow flow to scour sediment or run over non-paved, non-vegetated areas.

2. Direct flow through a diffuser containing chemical dechlorination tablets such as Vita-D-Chlor or approved equal.

3. Direct flow to a portable holding tank and dechlorinate prior to releasing or remove from site and dispose of the water in accordance with state and local regulations.

3.04 BACTERIOLOGICAL TESTS

A. Collect samples at each sampling location in accordance with AWWA C651 after final flushing and before water utility piping systems are placed into service.

B. Perform sampling in accordance with Option A of AWWA C651.

C. Passing Laboratory Results: Absence of any coliform bacteria and heterotrophic plate count (HPC) less than 500/ml in both sets of samples.

D. Re-flush and re-sample water utility piping systems if either set of samples fails to produce passing results in accordance with AWWA C651. If re-sampling results fail, re-chlorinate, re-flush and re-sample in accordance with AWWA C651 until passing results are obtained.

3.05 REPAIR/RESTORATION

A. Remove temporary blow-off and sample lines down to corporation stop once water utility piping system has been accepted and placed into service

3.06 FIELD QUALITY CONTROL

A. Provide field testing of free chlorine residuals to ensure appropriate concentrations are being achieved during disinfection in accordance with AWWAC651, and during flushing water disposal in accordance with AWWA C655.

END OF SECTION

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SECTION 33 10 00

WATER DISTRIBUTION PIPING, VALVES AND FITTINGS

PART 1 – GENERAL

1.01 SUMMARY

A. Work under this Section includes installation of new gate valves and hydrants installation of water main pipe, fittings, bridge crossing supports, water services and all appurtenances necessary to complete the Work shown on the Drawings.

B. Related Sections

1. 31 20 00 Earthwork

2. 33 01 10.58 Disinfection of Water Utility Piping Systems

1.02 PRICE AND PAYMENT

A. Measurement and Payment Requirements: Per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. American Public Works Association (APWA) Uniform Color Code

2. American Society for Testing and Materials (ASTM)

a. ASTM A47 Standard Specification for Ferritic Malleable Iron Castings

b. ASTM A136 Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

c. ASTM A307 Standard Specification for Carbon Steel Bolts and Studs 60,000 PSI Tensile Strength

d. ASTM A536 Standard Specification for Ductile Iron Castings

e. ASTM B88 Standard Specification for Seamless Copper Water Tube

f. ASTM C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

g. ASTM D1248 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

3. American Water Works Association (AWWA)

   a. AWWA C104 Cement-Mortar Lining for Ductile-Iron Pressure Pipe and Fittings

   b. AWWA C105 Polyethylene Encasement for Ductile-Iron Pipe Systems

   c. AWWA C110 Ductile-Iron and Gray-Iron Fittings

   d. AWWA C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

   e. AWWA C115 Flanged Ductile-Iron Pipe or Gray-Iron Threaded Flanges

   f. AWWA C151 Ductile-Iron Pipe, Centrifugally Cast

   g. AWWA C153 Ductile-Iron Compact Fittings

   h. AWWA C207 Steel Pipe Flanges for Waterworks Service

   i. AWWA C219 Bolted, Sleeve-Type Couplings for Plain-End Pipe

   j. AWWA C504 Rubber-Seated Butterfly Valves

   k. AWWA C509 Resilient-Seated Gate Valves for Water Supply Service

   l. AWWA C550 Protective Interior Coatings for Valves and Hydrants

   m. AWWA C600 Installation of Ductile-Iron Water Mains and Their Appurtenances

   n. AWWA C651 Disinfecting Water Mains

   o. AWWA C800 Underground Service Line Valves and Fittings

   p. AWWA C900 Polyvinyl Chloride Pressure Pipe and Fabricated Fittings

   q. AWWA C901 Polyethylene Pressure Pipe and Tubing

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: Per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data: Submit manufacturer's product data and installation instructions for each product specified for water service piping.

C. Shop Drawings

D. Samples and Mockups: As specified in Article 1.06.

E. Certificates

1. Manufacturer's notarized certificate certifying conformance with the Specifications to accompany shipments.

F. Design Data/Submittals

1. Pipe manufacturer’s anti-floatation calculations for each pipe material and details, signed and stamped by a licensed Professional Engineer in the State of Maine based on the following criteria:

a. Groundwater elevation shall be set at grade above the pipe.

b. Factor of safety shall be 1.1; downward forces from the weight of the pipe and soils over pipe shall be 1.1 times the buoyant uplift forces.

c. The pipe shall be considered empty. Calculations shall not consider the weight of internal water.

G. Manufacturer Instructions

H. Field Quality Control Submittals

a. Test results.

b. Logs of inspection and testing.

I. Closeout and Maintenance Material Submittals: Per Division 01 General Requirements.

1. Record depth and take ties as directed by the Engineer for Conformed to Construction Records.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

1. Comply with Owner requirements.

2. Code Compliance: Comply with State Plumbing Code and local plumbing codes. Where there is a conflict in the codes, the more stringent code shall apply.

3. AWWA Standards: Comply with requirements of latest revision of AWWA C651 including Section 4.3, "Preventive and Corrective Measures During Construction" for cleanliness.

4. General: All products used in the construction that come in contact with drinking water shall meet the National Sanitation Foundation Standard 61 for Drinking Water System Components - Health Effects. The primary focus of the standard is on contaminants or impurities, which may be imparted indirectly to drinking water. The products and/or materials covered include, but are not limited to, protective materials (coatings, linings, liners, etc.), joining and sealing materials (solvent cements, welding materials, gaskets, etc.), and mechanical devices used in transmission/distribution systems, (valves, etc.).

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packing, Shipping, Handling, and Unloading

1. Provide that each shipment of pipe, pipe fittings and appurtenances include manufacturers' Certificate of Conformance.

2. Inspect upon delivery and reject pipe immediately that does not conform to the specified requirements or has been damaged beyond repair and immediately remove from Site.

C. Waste Management and Disposal

1. Remove damaged pipe from Site and legally dispose of pipe.

1.08 SITE CONDITIONS

A. Existing Conditions: Per Division 01 General Requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. Provide fittings of same type and class of materials as pipe. Provide commercially manufactured wyes or tees for service connections. Fitting must have single piece gasket.

2.02 MATERIALS

A. Blank Flanges

1. 250 lbs. Class 125 bolt hole (C115/A21.15).

B. Brass fittings for type "K" copper tubing and HDPE (CTS)

1. All fittings will be made of No Lead Brass. (0.25% lead or less brass).

2. 3/4-inch through 2-inch brass fittings shall have a lead content meeting standards noted above for the fitting in question. The vendor shall supply the Department with the lead content of the fittings. Fittings shall conform to ANSI/AWWA C800 standards for Type "K" soft copper and shall be compression type on the copper end. CTS (Copper Tubing Size) HDPE shall have stainless steel insert stiffeners.

3. Brass Goods (Miscellaneous)

   a. Shall be 125 lbs., brass shall have a lead content meeting standards noted above for the fitting in question. The vendor shall supply the Department with the lead content of the fittings, with iron pipe size (IPS) threads shall be used for connecting water services. Items included are bushings, couplings, elbows, nipples, plugs, and tees. Manufactured by Lee, Wheeler, Nibco, Hayes, Ford, McDonald EB2, Mueller, Cambridge Brass, or approved equal.

4. Corporation Stops

   a. 1-inch corporations shall have a lead content meeting standards noted above. The vendor shall supply the Department with the lead content of the fittings. Corporations shall have a ball valve type construction with inlet CC thread and compression pack joint on the outlet, heavy patterns, and shall conform to AWWA/ANSI C800.

   b. 1 1/4-inch to 2-inch corporations shall, have a lead content meeting standards noted above. The vendor shall supply the Department with the lead content of the fittings, with inlet iron pipe (I.P.) thread and compression pack joint on the outlet, heavy patterns, and conforming to AWWA/ANSI C800. Manufactured by Ford, Hayes, McDonald EB2, Mueller, Cambridge Brass, or approved equal.

5. Curb Stops

   a. Curb stops shall have a lead content meeting standards noted above. The vendor shall supply the Department with the lead content of the fittings. Curb stops shall have a ball valve type construction or approved equal with compression pack joints on each end. Curb stops shall open left with no drain, have heavy patterns, and shall conform to AWWA/ANSI C800. Curb stops shall be manufactured by Ford, Hayes, McDonald EB2, Mueller, Cambridge Brass, or approved equal.

6. Copper Tubing:

   a. Copper tubing shall be type "K" soft copper (ASTM B88). Bar copper is also allowed.

7. Copper Tube Size (CTS) High-Density Polyethylene (HDPE)

   a. High Density Polyethylene (HDPE) pipe may be used on the owner's side of the service line after the curb stop outside the right of way. The HDPE must be copper tubing size (CTS) and conform to AWWA standard C901 (PE 3608 Pressure Class 200) and be clearly marked. Stainless steel inserts and compression fittings must be used at all joints.

   b. Tubing shall be approved for potable water service by the National Sanitation Foundation and bear the NSF seal. The product shall be rated for a minimum 200 working PSI and standard ratio (SDR) shall not exceed 9 for tubing size. Fittings shall be equipped with compression-type connections with insert stiffeners.

   c. These materials shall comply with AWWA C-901, ASTM-D-1248 and D-2737, PE 3608.

8. Copper Meter Setters

   a. Meter setters for 5/8 x 3/4 -inch, 3/4-inch, and 1-inch meters shall have compression pack joint connections on the inlet and outlet ends suitable for 3/4-inch copper tubing. Meter setters for meters shall have female iron pipe thread connections on the inlet and outlet ends. Two meter gaskets shall be supplied with each horn. Manufactured by McDonald EB2, Cambridge Brass, or approved equal.

   b. Duc Lugs and Tie Bolts: Duc lug bolts shall be Star Supply Corp. or approved equal. Tie bolts with hexagonal nuts shall be Star Supply Corp. or approved equal.

9. Flanged Adaptors: Flanged adapter couplings shall have either a ductile iron ASTM A536 or gray iron ASTM A126 body. Bolt circle, bolt size, and spacing shall conform to ANSI 150 lbs. flange drilling. Grade 30 gasket with either a malleable iron ASTM A47 or ductile iron ASTM A536 follower. Anchor studs shall be installed for a minimum working pressure of 125 psi. Bolts and nuts shall be ductile iron ASTM A536, Rockwell 912, or approved equal.

C. Pipe

1. Pipe shall be either ductile iron or approved plastic (PVC and HDPE mains requires Owner and Engineer approval prior to use). Pipes shall be

standard sizes only. Three-inch pipe is not allowed for public or private water lines.

2. Ductile Iron Pipe

   a. (4-inch and larger): Ductile iron pipe used for exterior piping shall be manufactured in accordance with the latest revision of AWWA/ANSI C151/A21.51. Ductile Iron pipe shall have a minimum thickness Class 52, centrifugally cast, double cement lined in accordance with AWWA/ANSI C104/A21.4, with factory applied bituminous coatings in accordance with AWWA C151, push-on type, unless otherwise specified on the Drawings.

   b. Encased or coated pipe shall be utilized on all ductile iron pipe installed in corrosive soils. Coating or encasement shall be listed for the corrosive soil and meet pertinent standards.

   c. Provide two serrated silicon bronze electrical continuity wedges or other approved external conductor connections at each bell joint. Wedges shall be equally spaced at 9:00 and 3:00.

3. Plastic Pipe

   a. PVC: (AWWA) (4-inch to 12-inch diameter). Requires Department approval before using. Pipe shall be polyvinyl chloride (PVC) AWWA pressure pipe with push-on joints conforming to ANSI/AWWA C900. Pipe shall be Class 150 meeting the requirements of SDR 18. Standard laying lengths shall be 20 feet for all sizes. At least 80 percent of the total footage of pipe of any size shall be furnished in standard lengths. The remaining 15 percent can be random lengths at least 15 feet long. All pipe shall be clearly marked with one-inch letter "WATER" at 12-inch intervals two sides 180 degrees apart the entire length.

   b. HDPE Service

      1) High Density Polyethylene (HDPE) pipe may be used on the owner's side of the service line after the curb stop outside the right of way. The HDPE must be copper tubing size (CTS) and conform to AWWA standard C901 (PE 3608 Pressure Class 200) and be clearly marked. Stainless steel inserts and compression fittings must be used at all joints. HDPE pipe shall comply with AWWA C-901, ASTM-D-1248 and D-2737, PE 3608.

      2) Tubing shall be approved for potable water service by the National Sanitation Foundation and bear the NSF seal. The product shall be rated for a minimum 200 working PSI and standard ratio (SDR) shall not exceed 9 for tubing size.

Fittings shall be equipped with compression-type connections with insert stiffeners.

3) The minimum allowable service diameter for HDPE water lines is 1-inch.

c. HDPE Water Main and Service Laterals 4-inches and Larger

1) With prior written Department approval High Density Polyethylene (HDPE) pipe may be used in specific applications such as directional drilling when installing water mains and service laterals . The HDPE shall be minimum of SDR 9 IPS or equivalent. A written request will be made to the Department with a PE's endorsement's and description of the pipe rating selection.

d. Tracer wire shall be 12-gauge UF wire with joint seal, tested for continuity, and placed over all plastic pipe.

D. Marking Tape

1. Marking tape shall be 3" wide, non-ferrous, and marked "WATER".

E. Pipe Couplings

1. Provide sleeve type couplings to join all plain end pipes and exterior below grade transitions in piping materials as shown on the Drawings, and as specified and outlined in AWWA C 201 standards. In cases where the outside diameters of the piping segments to be connected differ, provide reduction/expansion sleeve type couplings.

2. Unless otherwise indicated, sleeve type couplings shall also be provided for all exterior below grade piping runs prior to entering and exiting buildings or structures. The couplings shall be installed prior to the building or structure wall penetration to allow for differential settlement of the piping and structure. All sleeve type couplings shall conform to the provisions of AWWA C 219 standards. All sleeve type couplings shall be rated for use with the same operational pressure as the connecting pipes.

3. Sleeves shall be epoxy coated ductile iron ASTM A536, and shall have smooth inside taper for uniform gasket seating. Gasket shall be grade 30. Follower flanges shall be ductile cast iron ASTM A536. Bolts shall be 304 stainless steel with heavy 304 stainless steel hexagon nuts to ANSI/AWWA C111/A21.11 standards. OD range shall be approved by the Owner and Engineer. Ford coupling or approved equal.

4. Contractor shall use solid sleeve coupling unless site connections do not allow or as otherwise approved by Owner and Engineer. No repair couplings shall be used for new construction unless otherwise approved.

F. Pipe Fittings

1. Pipe fittings shall have mechanical joint ends conforming to ANSI/AWWA C1/A21.11, double cement lining and bituminous coating conforming to ANSI/AWWA C104/A21.4.

2. Fittings shall be supplied with mechanical joint accessories unless specified others, with high strength low alloy steel bolts and heavy hexagon nuts conforming to ANSI/AWWA C111/A21.11.

3. Long body fittings shall be Class 350 ductile iron conforming to ANSI/AWWA C110/A21.10.

4. Compact body fittings shall be Class 350 ductile iron conforming to ANSI/AWWA C153/A21.53.

G. Repair Sleeves

1. Shall have single band of 304 stainless steel with 3904 stainless steel bolts and nuts as manufactured by Rockwell or approved equal.

H. Restraining Glands

1. Mechanical joint restraining glands shall be heavy duty ductile iron body, UL or FM approved equal.

a.	4-inch	350 psi
b.	6-inch	350 psi
c.	8-inch and larger	250 psi

2. Set screws shall be either “Cor-Ten” steel, ductile iron, or approved equal. The number of set screws shall be equal to or greater than the number of the nominal diameter of the gland (i.e. four-inch, four sets of screws; six-inch, six set of screws). Locking rings and megalugs are acceptable replacements for retainer glands, but are not a replacement for thrust blocks.

I. Service Boxes, Covers, and Rods

1. Service boxes shall be Erie style with arch pattern, one-inch in diameter, constructed from SC #40 Black Steel, adjustable in length from five feet to six feet, and have 1/2-inch diameter stainless steel rod 24 or 36-inches in length with brass cotter pins. One-inch caps shall be extra heavy with brass pentagon plug and coarse “rope” thread to fit a one-inch Erie style box. All caps shall have the word “WATER” clearly cast in top and be constructed of a magnetic material.

2. Any service box placed where vehicles may travel, including paved sidewalks, shall be placed inside of a gate valve box top in accordance with these specifications.

J. Service Box Foot Adapter

1. Service box foot pieces shall be cast iron and fit all standard one-inch Erie style service boxes and fit over curb stops larger than one inch.

K. Service Saddles

1. Shall be constructed of ductile iron with epoxy coating and with two stainless steel bands, nuts, washers, and I.P. threads. Body casting shall be wrap-around design of high tensile ductile iron conforming to ASTM A536. Gasket shall be of 3 1/2-inch diameter and constructed of Buna-N, and grooved to conform to the pipe surface, bonded in place for easy installation. Finish shall be epoxy coated. Ford FC202 or approved equal.

L. Tapping Sleeves

1. Mechanical Joint Tapping Sleeve

a. Shall be ductile iron and have ductile iron mechanical joint end seals conforming to AWWA C111, with outlet flange conforming to AWWA C207, class D with ANSI 150 lb. drilling recessed for tapping valve. Tapping sleeve shall fit AWWA standard of 1908, Class AB-CD cast iron pipe. Manufactured by Clow, Mueller, or approved equal. Acceptable for cast iron and ductile iron pipe.

2. Stainless Steel Tapping Sleeve

a. Shall be entirely 304 stainless steel or 304 stainless steel body with ductile iron outlet flange conforming to AWWA C207 Class D, ANSI 150 lb. drilling recessed for tapping valve. Bolts shall be high strength 18-8 stainless steel with heavy hexagon nuts conforming to ANSI/AWWA C111/A21.11.

3. Gasket material shall be grade 30 or approved equal, and shall have a smooth inside taper for uniform seating. Acceptable for ductile iron pipe.

4. All size on size taps require full body Ductile Iron MJ tapping sleeves.

M. Tapping Valves

1. Tapping valves shall be epoxy coated with 200 psi working pressure, non-rising stem, “O” ring, open left, flanged end conforming to AWWA C207, Class D, ANSI 150 lb. drilling, mechanical joint end conforming to AWWA C111, two-inch ductile iron operating nut with 304 stainless steel bolt, resilient seated gate valve conforming to ANSI/AWWA C509,

manufactured by Waterous Series 500, American Darling CRS 80, Mueller A2360, AVK series 25, or approved equal.

2. Tapping valves shall be supplied with standard mechanical joint accessories, 304 stainless steel bolts, and heavy hexagon nuts conforming to ANSI/AWWA C111/A21.11.

3. Tapping valve seal plates and bonnets shall have either all silicone bronze or 304 stainless steel bolts and nuts.

N. Valves

1. Valves shall be epoxy coated inside and out and supplied with standard mechanical joint accessories, high strength low alloy steel bolts and heavy hexagon nuts conforming to ANSI/AWWA C111.A21.11.

2. Valve seal plate and bonnet shall have either all-silicone bronze or 304 stainless steel bolts and nuts.

3. All interior and exterior valve surfaces shall be fully coated with a corrosion resistant epoxy protective coating in accordance with AWWA C-550. Coating shall be applied at the factory and shall be non-toxic and approved for potable water.

4. All valves shall be **open left**.

5. Butterfly Valves (16-inch diameter and larger)

   a. Shall be a non-directional ductile iron valve with a steady state working pressure of 250 psi, bubble-tight in both directions at rated psi, open left, mechanical joint ends, non-rising stem, two-inch ductile iron operating nut with stainless steel bolt, conforming to AWWA C504. Manufactured by Clow, Dresser, Mueller, or Pratt.

6. Gate Valves (12-inch diameter or less)

   a. Shall be 250 psi working pressure, non-rising stem, “O” ring, stem seal, open left, mechanical joint, two-inch ductile iron operating nut with stainless steel bolt, resilient seated gate valve conforming to AWWA C509, manufactured by Waterous Series 500, American-Darling CRS 80, Mueller A 2360, AVK series 25, or approved equal.

7. Insert Valves

   a. Insert valves may be allowed with prior approval from the Department. The insert valve must be installed in the presence of a Brewer Water Department inspector. Engineer must receive and

approve of material submittals before any insert valves can be installed.

O. Valve Boxes

1. Valve box shall be cast iron, or ductile iron free from defects, manufactured in the USA or Canada, two piece, sliding type with a top flange, top section, no inside stops, a minimum inside shaft diameter of 6 and 1/16 inches, and a minimum clear opening at the top of 7 and ½ inches. Bottom section shall be slip bell style with a minimum clear opening at the bottom of 10 and ¾ inches. Length of top section shall be a minimum of 24 inches. Middle and bottom section length as needed, with a minimum of 6 inches of overlap. Valve box covers shall be sized as recommended by the manufacturer to fit the valve box top, and have the word "WATER" clearly cast into the cover.

P. Valve Box Top-Extension and Cover

1. Valve box extensions may be used in areas that will not be subject to vehicular traffic. Shall be cast iron, manufactured in the USA or Canada. Boxes will have "WATER" cast in cover.

2. Pioneer-style box shall be 4.5-inch or 5.25-inch straight body.

Q. Accessories

1. Accessories such as gaskets, glands, bolts, nuts, etc., shall be designed in accordance with AWWA/ANSI C-111/A21.11 and shall be furnished as required to make all piping systems complete.

2.03 RIGID INSULATION (TRENCH)

A. Provide rigid insulation for trench insulation as specified, as indicated on the Drawings, or as directed by the Engineer.

B. Insulation shall be a rigid extruded polystyrene (XPS) thermal insulation with closed cells and integral high-density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578.

C. Insulation shall conform to the following properties:

1. Thermal Resistance: 5.0 ft2-h-0F/Btu, per ASTM C 518 & ASTM C 177

2. Compressive Strength: 25 psi (minimum), per ASTM D 1621

3. Flexural Strength: 50.0 psi (minimum), per ASTM C203

4. Water Absorption: 0.3% by volume, per ASTM C 272

5. Water Vapor Permeance: 1.5 perms, per ASTM E 96

6. Maximum Use Temperature: 165 0F

7. Coefficient of Linear Expansion: 3.5x10-5 in/in-0F, per ASTM C 203

8. Insulation Type: IV, per ASTM C 578

D. All rigid insulation for trench insulation shall be a product of the following manufacturer:

1. Owens Corning Foam Insulation, LLC - FOAMULAR 250 XPS

2. The Dow Chemical Company – STYROFOAM Brand Square Edge Insulation

3. Engineer-Approved Equal

2.04 BRIDGE CROSSING

A. Pipe and Fittings

1. General: Provide fittings of same type and class of materials as pipe.

2. Pipe: Class 54 Ductile Iron with “Mech-Lok” restrained joint.

3. Hangers, Supports and Miscellaneous:

a. Hanger Rod: Galvanized steel threaded rod, ASTM F1554, Grade 36 steel, length and diameter as required by hanger manufacturer.

b. Pipe Roll: Equal to Anvil or ITT Grinnell.

c. Insulation Protection Saddle: Equal to Anvil or ITT Grinnell.

4. Expansion Joint: Constructed of Ductile Iron conforming to ANSI/AWWA C153/A21.53. Expansion joint shall be capable of a minimum of 4” of axial movement. Expansion joint shall be Ex-Tend 200 as manufactured by EBAA Iron or approved equal.

B. Insulation and Protective Jacket

1. Insulation and protective jacket shall be provided in accordance with Section 40 42 13.

C. Heat Tracing

1. Heat Trace Heater: Piping to have two (2) runs of heat trace its entire length. Heat trace shall be provided in accordance with Section 40 41 13, Process Pipe Heat Tracing.

2. Accessories: Provide all necessary accessories for power connection, end seal, taping, and pipe labels ("Electric Traced") as recommended by manufacturer to make a complete system.

PART 3 – EXECUTION

3.01 GENERAL

A. Coordinate all water main Work with Owner.

3.02 INSTALLATION

A. General: All materials to be used shall be stored and handled in accordance with the manufacturer's recommendations. The Contractor is responsible for replacing at his/her cost any pipe and/or material damaged during the course of unloading or construction. Prior to any work on the bridge, notify MDOT Maintenance and Operations Division. The general procedure and methods of constructing the bridge crossings will be at the option of the Contractor, subject to approve of the Engineer and the requirements of the Contract.

B. Pipe Unloading: It is the responsibility of the Contractor to unload and string pipe. Pipe shall be lifted off the truck and placed on the ground with care and in accordance with manufacturer’s recommendations to prevent damage to the pipe and the cement-lined interior of the pipe. Rolling the pipe off the truck or dropping the pipe is prohibited. Pipe may be stacked, but no more than three layers high and only with proper blocking in between layers.

C. Pipe Jointing: For exterior piping, all joints shall be made in a dry trench and in accordance with the manufacturer's recommendations and the best practices for class of pipe laid. The ends of the pipe shall be wiped clean with a dry cloth before making the joint.

D. Trench Payment Limit: For all exterior piping, fittings, valves and appurtenances, the payment limits for excavation and backfill shall be Pipe outside diameter plus 2 feet wide, with a maximum of 8 feet wide, and 6-inches below the invert of the proposed pipe, fitting, etc.

E. Pipe Laying

1. Installation of ductile iron water main and appurtenances shall be in accordance with the requirements of AWWA C600 (latest revision). The pipe shall be accurately laid to the line and grades shown and to the satisfaction of the Owner. Where necessary, the line and grade may be adjusted by the Owner from that shown on the Drawings to meet field conditions, and no extra compensation shall be claimed, therefore.

2. New pipe shall be installed with a minimum of 6 feet of cover, measured from pipe crown to finished grade, unless otherwise shown on the Drawings or approved, in writing, by the Owner.

3. Where new pipe is to connect to existing pipe with less than 6 feet of cover exist, off-sets or joint deflection, in accordance with the allowances specified below, shall be used to transition from existing pipe elevation to new pipe elevation.

4. Insulation: All pipe installed with less than 6-feet of equivalent soil cover (where approved) or with less than 6-feet of equivalent soil cover between the pipe and storm drain piping (i.e., culverts, underdrain, etc.) shall be insulated with rigid insulation for trench insulation as specified and as shown on the Drawings. One inch of rigid foam insulation shall be equivalent to one foot of equivalent soil cover. The insulation shall extend the width of the trench, a minimum of 4 feet. Insulation shall be installed on the vertical sides of the trench as shown on the Drawings where the minimum equivalent soil cover is not maintained between the pipe and adjacent storm drain piping. No pipe shall be installed with less than 5 feet of cover without prior written approval of the Owner.

5. Joint Deflection: When it is necessary to deflect pipe from a straight line in either the horizontal or vertical plane, the maximum joint deflection shall not exceed that specified in AWWA C-600 (latest revision) or the maximum allowable deflection permitted by the manufacturer.

6. When mechanical joint, push-on joint, or similar pipe is installed, the bell of the pipe shall be cleaned of excess tar or other obstruction and wiped out before the cleaned and prepared spigot of the next pipe is inserted into it. The gasket, bell, and spigot shall be lubricated with gasket lubricating compound compatible with potable water. The new pipe shall be shoved firmly into place until properly seated and held securely until the joint has been completed. All pipes shall be pushed home by a method that protects the driving end of the pipe. Also, a minimum of two copper or bronze wedges shall be driven between each cast iron and/or ductile joint.

7. Pipe shall be installed beginning at the stub end, unless otherwise approved by the Owner. The interior of each length of pipe shall be swabbed and wiped clean before laying the next length. Whenever the Work is stopped, whether temporarily or for an extended period, the end of the pipe shall be carefully protected to prevent dirt, water, or other extraneous material from entering the pipe by use of a construction cap. Bedding shall be as shown on the plans. No pipe shall be covered, or trench backfilled until approved by the Owner.

8. In areas where the Contractor's trenching operation exceeds the typical section, the Contractor may be required to use a higher strength class pipe in lieu of the designated class at no additional cost to the Owner.

9. Restrained joints shall be provided for water mains where any bends, tees, plugs, wyes, or valves are installed. The length of joint restraint shall be in accordance with AWWA Ductile Iron Pipe and Fittings Manual of Practice M41.

F. Valve Installation: All valves shall be installed in accordance AWWA C-600, AWWA C-515 and the manufacturer's recommendations. Valves shall bear no stresses due to loads from the adjacent pipe. All valves shall be inspected before installation, and they shall be cleaned and well lubricated before being installed in the line. Secure to distribution main by means of rods or retainer glands.

G. Tapping Sleeves and Valves and Insertion Valves: Pipe shall be adequately supported such that machinery used to tap the main does not put undue stress on the pipe. Support of pipe may include construction of a concrete pad to distribute the load. Additional payment will not be made for construction of a concrete support pad.

H. Pipe Cutting

1. Where required, sections of pipe may be cut to provide shorter sections of pipe necessary for the construction. The cutting of the pipe shall be done in accordance with the pipe manufacturer's recommendations and subject to the approval of the Owner.

2. In general, the pipe material shall be cut by using a saw or milling process, approved by the pipe manufacturer. The pipe shall be cut, not broken. The cut end of the pipe shall be square to the axis of the pipe and any rough edges ground smooth.

I. Thrust Blocking, Anchorage, and Joint Restraint Water Line Fittings

1. Thrust blocking and anchorage is required wherever the pipe:

   a. changes direction as at tees, bends, crosses, and tapping sleeves

   b. changes sizes, as at reducers

   c. stops, as at dead ends and hydrants

   d. requires additional thrust restraint per manufacturer recommendations.

2. Concrete shall be used for thrust blocks, and they shall be poured in place or pre-cast. Precast thrust blocks are preferred method. Cast in place thrust blocks will be allowed on a case by case basis with Owner and Egineer approval. Cast-in-place thrust blocks shall be constructed by pouring

concrete between the fitting and the undisturbed wall of the trench. A low slump mixture shall be used so that the concrete may be easily shaped into the desired form, a wedge with the wide end against the solid wall. Cast-in-place thrust blocks shall be poured using forms. Care shall be exercised to ensure that the concrete is clear of joint accessories, bolts, nuts, and flanges. A layer of 8-mil poly sheeting shall be placed between the main, fittings, bolts and the concrete thrust block.

3. The Contractor shall furnish and install all materials and equipment, and perform all labor for the manufacture, transporting, placing, curing, and testing concrete for thrust blocks. Concrete shall be composed of Portland cement, water, fine and coarse aggregate, and an air-entraining mixture.

4. Aggregates shall conform to ASTM C33. For thrust blocks, all aggregates shall be able to pass through a screen with 2-inch square openings.

5. Preferably, water used in mixing and curing concrete shall be potable. Non-potable water shall be fresh, clean and free from injurious amounts of sewage, oil, acid, alkali, salt, and organic matter.

6. Air entraining admixtures shall conform to the Specifications for Air Entraining Admixtures for Concrete (ASTM C260).

7. Unless otherwise shown on drawings, concrete used for thrust blocks shall have a 28-day compressive strength of 3,000 psi.

8. Curing and form removal for concrete thrust blocks, and requirements due to air temperature and weather conditions shall follow proper construction practices and shall be subject to approval by the Engineer.

9. Concrete used for thrust restraint shall be sized in accordance with the thrust block schedule provided shown on the Drawings.

10. Water mains shall be protected from movement by thrust forces in the following manner:

    a. All fittings, valves, hydrants, and caps shall have ductile iron standard or wedge restraint glands, unless otherwise directed by the Owner and Engineer.

    b. All push-valves used on C900 plastic pipe shall be anchored to a thrust block.

    c. Anchor all valves to tees or bends with stainless steel threaded rod.

J. Water Service Piping

1. Services shall be tapped on the side of the main. Service piping shall be copper with a minimum size of 1-inch. Enough slack shall be placed in the

material to prevent stretching or pulling from main. A service shut off (curb stop) with rod shall be placed in a service box within the right of way line in the public way. Any service box located in a paved area including sidewalks shall be installed inside a full-sized gate box top section. At least two permanent location measurements to the service shut off must be obtained.

2. For new main extensions, the service shall be installed at the center of the lot to be served. The only exception will be when a foundation is already on the lot. In that case, the service can be installed anywhere along the foundation frontage to the road. For new services installed on existing mains, the service shall be installed a minimum of 5 feet from the property line.

3. Standard small service sizes include 1-inch, 1-1/2-inch and 2-inch diameters. 1-1/2-inch and 2-inch services shall consist of a corporation threaded into an approved tapping saddle. One-inch corporations shall be threaded into the main.

4. Domestic and fire services to the same building shall consist of completely separate lines beginning at the main. Combined services (fire services greater than 2" that have a domestic service tapped at the street line) shall require approval during the plan review process of a project. If approved, combined services shall have individual shut-off valves for both the fire and domestic service in the right-of-way. Additional gate valves may be necessary under certain situations.

K. Repair Clamps: Repair clamps are not considered as permanent repairs. If a section of main is found to be defective, it shall be cut out and a new section of pipe shall be installed using solid cast couplings, at no additional cost to the Owner.

L. Bridge Crossing

1. Heat trace shall be installed in accordance with Section 40 41 13, Process Pipe Heat Tracing.

2. Insulated Pipe: Install pipe, insulation, weather barrier coating and protective jacketing per manufacturer's instructions.

3. Heat Tracing: Install heat tracing per manufacturer's instructions. At each protection saddle (1-foot length), 2 feet of heat tape is required. Heat tracing shall not be in contact with protection saddles. Spiraling heat tape is not permitted.

a. Layout:

1) Two runs of heat tracing start at the northwest end of the bridge, run along the pipe across bridge to terminate at the junction box at the southeast end of the bridge. Heat tracing shall extend as shown on Drawings. Locate heat tracing at 4:00 and 8:00 positions of pipe.

4. Steel and Pipe Supports: All structural steel and pipe supports shall be galvanized steel and shall be installed as indicated on the Drawings.

5. Existing Bridge Structure: Care shall be taken to ensure and maintain the structural integrity of all members of the existing bridge. Any damage to the bridge structure due to construction shall be repaired to match existing to the approval of the Engineer and MDOT.

6. Alignment: All gravity sewer pipe and fittings shall be aligned to conform to the lines and grade as shown on the drawings. Each pipe and fitting shall be laid to form a closed joint with the previously laid pipe or fitting and bring the pipe to the required grade by adjustment of the pipe supports.

7. Clean Up: Upon completion, the area of the bridge crossing shall be restored to its original condition.

3.03 SPECIAL REQUIREMENTS

A. Pressure Pipe - Ductile Iron: Valves shall bear no stresses due to loads from the adjacent pipe.

B. Assembling Mechanical Joints: Surfaces against which the gasket will come in contact shall be thoroughly brushed with a wire brush prior to assembly of the joint. The gasket shall be cleaned. The gasket, bell, and spigot shall be lubricated by using gasket-lubricating compound compatible with potable water. The spigot shall be inserted into the bell until it is correctly seated. The gasket shall then be seated evenly in the bell at all points, centering the spigot, and the gland shall be pressed firmly against the gasket. After all bolts have been inserted and the nuts have been made up finger-tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint to the proper tension by means of a torque wrench. Mechanical joints shall be assembled with mechanical joint retainer glands.

C. Torque mechanical joint bolts with a torque wrench to the range specified in AWWA C-600. Mechanical joint bolts shall be re-torqued to the range specified in AWWA C-600 after waiting a period of two hours. If effective sealing of the joint is not attained at the maximum torque specified, the joint shall be disassembled and thoroughly cleaned, then reassembled. Bolts shall not be overstressed to tighten a leaking joint.

D. Connection to Existing Water Main: The Contractor shall locate and confirm sizes and materials of existing mains, excavate, cut out a section of existing main, install a tee, pipe, couplings, and a valve, and backfill the excavation. The Contractor shall provide all materials, including mechanical joint accessories, valve boxes, and other items necessary to make all joints watertight and provide complete and effective connections to existing water mains. Existing water main shall remain active at all times.

E. Hydrants shall be set so the face of the breakaway flange is located 4 inches above finish grade.

F. Coordinate connections to existing water mains with the Owner of the water mains. Provide 48 hours' notice prior to such Work. The Contractor is responsible for the cost and all Work associated with connection to existing mains unless otherwise noted.

G. Tracer Wire: Install tracer wire continuously along proposed water main. Where a termination point is not available, i.e., dead-end installation, provide tracer wire grounding anode.

1. Wire is not to be spliced unless approved by the Engineer. Use single length of wire along pipe between access points.

3.04 DISINFECTION

A. Contractor will perform disinfection testing.

B. If initial tests indicate non-compliance, Contractor shall be responsible for all labor, equipment, and materials to correct defective Work. Costs of retesting due to non-compliance will be paid by the Contractor.

3.05 TESTING OF WATER SERVICE PIPING

A. Perform hydrostatic testing of completed lines. Apply 1.5 times the working pressure for 20 minutes, 2-psi gage drop or less is acceptable.

B. Perform operational testing of valves by opening and closing under water pressure to ensure proper operation.

3.06 PRESSURE AND LEAKAGE TESTING OF WATER MAIN

A. Contractor shall perform hydrostatic pressure testing and leakage testing. If initial tests indicate non-compliance, Contractor shall be responsible for all labor, equipment, and materials to correct defective Work. Costs of retesting due to non-compliance will be paid by the Contractor.

B. Contractor shall provide all labor, equipment, material, gauges, pumps, etc. to test for leaks in accordance with AWWA Standard C600 as follows:

1. Pressurization of Pipe

    a. Fill each valved pipe section slowly with water at specified test pressure.

    b. Apply by means of pump or other approved method.

2. Air Removal

    a. Expel all air from pipe, valves, and hydrants before applying test pressure.

    b. Install corporation stops at high point to vent air if no release valves available.

    c. After air removal, close stops and apply test pressure.

    d. After test, remove stops and plug holes or leave stops in place permanently if directed by Engineer.

3. Hydrostatic Testing

    a. Test pressure: System shall be tested at a hydrostatic test pressure of one-hundred fifty (150) pounds per square inch (psi).

    b. Test pressure: Not to exceed pipe or thrust restraint design pressures.

    c. Test duration: 2 hours, minimum.

    d. Pressure variation tolerance: less than +5 psi for the duration of the test.

    e. Test pressure not to exceed valve or hydrant pressure ratings on sections including closed valves or hydrants.

    f. Monitor makeup water according to the Leakage Testing section herein.

4. Examination

    a. Examine exposed pipe, fittings, valves, hydrants, and joints during test.

    b. Repair or replace defective appurtenances discovered during test.

5. Leakage Testing

a. Leakage: Leakage shall be defined as the quantity of makeup water added into the pipeline undergoing hydrostatic pressure testing to maintain pressure within +/- 5 psi of the specified test pressure following pipeline filling and air removal.

b. Provide makeup water using a means allowing accurate measurement of the quantity.

c. Leakage shall not exceed the following limits (testing allowance):

$$L = \frac{SD\,P^{1/2}}{148{,}000}$$

Where L is the allowable leakage (testing allowance) in gallons per hour, S is the length of pipe in feet, D is the nominal diameter in inches, and P is the average hydrostatic test pressure in psi.

3.07 UTILITIES TO BE ABANDONED

A. Close open ends of abandoned underground utilities which are not indicated to be removed. Provide sufficiently strong closures acceptable to Engineer to withstand hydro-static or earth pressure which may result after ends of abandoned utilities have been closed. Remove or fill abandoned pipelines with concrete as directed by the Engineer.

3.08 CLEANING

A. Clean and flush piping after Work is completed and before final acceptance. Flush using water from existing main. Contractor shall coordinate with Owner to obtain all water required. Provide a minimum flushing velocity within the pipe of 2.5 feet per second. Contractor to dispose of all water flushed from mains in accordance with applicable laws and regulations.

3.09 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

SECTION 40 41 13

PROCESS PIPE HEAT TRACING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide process pipe heat tracing in accordance with this Section and applicable reference standards listed in Article 1.03.

B. Furnish, install, test, and make ready for operation, self-limiting process pipe heat tracing, appurtenances and coordinated systems as specified. Provide all related appurtenances, including but not limited to, thermostats, valves, piping, wiring, conduit, attachments, controllers, control relays, foundations, anchors, supports, and all related accessories for complete operational heat tracing systems as specified and as shown on the Drawings.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment Requirements: Per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. ASTM International (ASTM)

a. ASTM F 593 Stainless Steel Bolts, Hex Cap Screws, and Studs

b. ASTM F 594 Standard Specification for Stainless Steel Nuts

2. Institute Of Electrical and Electronics Engineers (IEEE)

a. IEEE Standard 515 Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Industrial Applications

3. National Electrical Manufacturers Association (NEMA)

a. NEMA ICS 1 Industrial Control and Systems: General Requirements

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: Per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Shop Drawings

1. Shop Drawings shall show layout and dimensions of equipment, major components, key alignment locations, and locations of attachments. Drawings shall also indicate where access points for maintenance and operations are located on the equipment. Drawings shall show critical field dimensions identified by the manufacturer and obtained by the Contractor. Shop Drawings shall include electrical wiring, control wiring, and grounding requirements.

2. Provide sufficient product data to verify compliance with the Specifications and to illustrate the construction and assembly of the products. Include compliance of materials and components with applicable CEAM, ASTM, American Gear Manufacturers Association (AGMA), and other standards. List the manufacture, model and weights of major components. Include catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures. Documentation shall illustrate size, physical appearance and other characteristics of materials, systems, or equipment.

3. Electrical splices, couplings, terminations, and fittings shall be shown on the Drawings and product submittals and shall be specifically identified with the applicable style or series designation. The Drawings shall show layouts and dimensions of the piping and wiring of the heat tracing systems.

C. Product Data

1. Product data shall include a complete list of equipment and materials including manufacturer's descriptive data and technical literature, performance charts, performance curves, catalog cuts, and installation instructions. Include warrantee language for the equipment and all related appurtenances.

2. Submit copies of manufacturers' complete parts list showing all parts, spare parts, and bulletins for the equipment. Clearly show all details, parts, and adequately describe parts or have proper identification marks. Photographs or catalog cuts of components shall be included for identification.

D. Test Reports

1. Provide Manufacturer report of heat trace system configuration and factory-programmed settings.

2. Provide report of required Field-Testing results.

E. Closeout and Maintenance Material Submittals: per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: Per Division 01 General Requirements for manufacturing and as follows.

1. Materials and equipment shall be the standard products of a manufacturer regularly engaged in the production of such equipment and shall essentially duplicate items that have been in satisfactory use in identical applications in other wastewater applications. The manufacturer shall have a minimum of 5 years of documented experience in the design and production of piping heat tracing systems of all types, and not less than 5 years of experience in the production of equal or larger sized models of the exact equipment as specified.

2. The manufacturer shall provide a list of at least 20 similar installations, including contact names and phone numbers. Equipment shall be supported by a service organization that is, in the opinion of the Engineer, reasonably convenient to the Site to ensure parts and service can be acquired in a timely fashion.

1.07 DELIVERY, STORAGE AND HANDLING

A. All spare parts shall be packed in containers bearing labels clearly designating the contents and respective pieces of equipment for which they are intended. All spare parts shall be delivered at the same time as the pertaining equipment.

B. All equipment delivered and placed in storage shall be stored with protection from the weather, humidity, temperature variations, dirt, dust, or other contaminants in accordance with the manufacturer's written instructions.

C. Inspect all equipment and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in a written claim with the shipper prior to accepting delivery. Validate all equipment serial numbers and parts lists with the shipping documentation. Notify the manufacturer of any unacceptable conditions noted with the shipper.

1.08 SITE CONDITIONS

A. Existing Conditions: Per Division 01 General Requirements.

1.09 WARRANTY

A. Special Warranty/Extended Correction Period

1. The manufacturer shall provide a full and comprehensive warranty for all equipment specified in this section. The equipment shall be warrantied to be free from defects in workmanship, design, and materials for a period of 10 years. If any parts of the equipment supplied under this section should fail during the manufacturer's Warranty Period, replacement of parts or the entire unit itself shall be provided. The units shall be restored to active working service at no expense to the Owner of the equipment. The manufacturer shall incur all costs including, but not limited to parts, labor, service, technicians, shipping, and handling required for restoration of equipment to active service as required under the manufacturer's warranty.

2. The manufacturer's warranty shall commence at the date of substantial completion or partial utilization.

PART 2 – PRODUCTS

2.01 GENERAL

A. Provide self-limiting heat tracing systems, all accessories, and related appurtenances for process piping systems as shown on the Drawings and as specified. All heat tracing systems shall conform to IEEE Std. 515 standards.

B. The heat tracing systems shall be designed and applied to protect all piping, fittings, valves, flow meters, gauges, drains and related appurtenances of each system as shown on the Drawings. Each system shall include over-heat protection.

C. All heating cable shall be parallel conductor type. All heating cable shall be designed for field cutting and splicing as required for installation. Heating elements shall be manufactured of polymers mixed with conductive carbon black. Heating elements shall be specifically designed for creating electrical paths for conducting current between the parallel bus wires along the entire cable length.

D. In each heating cable, the number of electrical paths between the bus wires shall change in response to temperature fluctuations. As the ambient temperature surrounding the heating cable decreases, the conductive core or fiber shall automatically contract microscopically. This contraction shall decrease the electrical resistance and create numerous electrical paths between the bus wires. Current shall flow across these paths to warm the core or fiber of the heat tracing. As the temperature rises, the core or fiber shall automatically expand microscopically. The expansion shall increase electrical resistance and the corresponding number of electrical paths shall decrease. As a result, the heating cable shall automatically begin to reduce its power output.

2.02 UNIT DESCRIPTIONS

A. Provide the following process pipe heat tracing systems as specified and indicated on the Drawings

Tag #	Description
Heat Trace System #1	Levenseller Bridge Crossing
Heat Trace System #2	Eastern Avenue Bridge Crossing

2.03 PROCESS DESIGN CONDITIONS

A. All electrical heat tracing shall be sized to accommodate the respective process design requirements. Each electrical heat trace system shall be designed and constructed in accordance with the following design criteria and service conditions:

HEAT TRACE DESIGN CRITERIA	
Number of Systems	Two (2)
Approximate Length (Each)	See Drawings Contractor to field verify each run
Maintain Temperature	40 degrees F (Minimum)
Ambient Air Temperature	-20 degrees F (Minimum)
Startup Temperature	0 degrees F (Minimum)
Shutoff Temperature	60 degrees F
Pipe Size	Levenseller Bridge Crossing Water Main: 12” Eastern Avenue Bridge Crossing Water Main: 16” (See Drawings)
Pipe Material	Type Cement-Lined Ductile Iron
Insulation Type	Polyisocyanurate
Insulation Thickness	2-inch
Insulation Jacket (Above Grade)	22-gauge or 18-gauge galvanized steel
Insulation Jacket (Below Grade)	50 mil Polyethylene Sheet Membrane
Power Supply	240 Volt, 1 Phase, 60 Hertz
Thermal Rating	6 W/ft
Electrical Hazard Area	Unclassified
Enclosures (Unclassified Areas)	NEMA 4 or NEMA 4X
Self-Regulation Factor	90% (Minimum)
Thermostat	Yes
Local Controller	Yes

Remote Control Capabilities	Yes
Remote Monitoring Capability	Yes
Power Connection Kit	Yes – above insulation with indicating light
End Termination Kit	Yes – above insulation with indicating light
Spiral Wrapping	No – not required
Labeling	Yes – at all exposed piping segments
Color Coded	Yes
Heating Cable Jacket	Fluoropolymer
Power Connection Kit	Yes – Above Insulation with Indicating Light
End Termination Kit	Yes – Above Insulation with Indicating Light
Spiral Wrapping	No – Not Required
Labeling	Yes
Temperature Identification	T6, T4 or T3
Heating Cable Jacket	Polyolefin

B. Provide one (1) Power Connection Kit and one (1) End Termination Kit for each heat tracing system.

C. Each system shall operate using a local electronic thermostat controller. The local controller shall include a separate thermostat above-grade and below-grade piping system. All heat tracing shall be wrapped around all valves, fittings, and related appurtenances according to Manufacturer installation instructions. The system shall be controlled by pipe temperature thermostats and use on/off control to energize the heat tracing if the pipe temperature reaches the specified startup temperature. The heat tracing shall automatically turn off when the pipe temperature reaches the previously specified shut off temperature.

2.04 HEATING CABLE

A. All heating cable shall be “constant wattage” designed for constant heating wattage output per length of cable. Cable shall be suitable for pulling through insulation system integral heat trace channels.

B. All heating cable shall be designed for a maximum continuous exposure (maintain) temperature of 150 Degrees F to 250 Degrees F or an intermittent exposure temperature from 185 0F to 420 0F. The cable shall be designed such that it can be crossed over itself and cut to length in the field if required.

C. The “constant wattage” heating cable shall consist of two fluoropolymers insulated 16 AWG or larger tinned copper bus wires, encased in a fluoropolymer insulated nichrome resistance heating wire inside of a tinned copper grounding braid and fluoropolymer outer jacket. Cables shall be colored coded according to cable voltage and rated wattage.

D. A ground-fault protection device shall be used to protect each circuit.

E. All heating cable shall be CSA certified for wet locations.

F. All heat tracing shall be compatible with the piping material. A power connection kit shall connect each heating cable.

G. Bus wires to power in a junction box. Tees and splices shall accommodate pipe branches to connect 2 or 3 heating cables together as required. An end seal kit shall be used to terminate the end of the heating cable in each system.

2.05 END TERMINATIONS

A. All connection components used to terminate heating cables, including power connectors, splices, tees, and connectors shall be approved for the respective Electrical Hazard Area Classification as previously specified. All connection components shall also be compatible as a system with the particular type of heating cable in use. Under no circumstances shall terminations be used which are not a product of the heating cable manufacturer.

B. In order to keep connections dry and corrosion resistant, components shall be constructed of a nonmetallic, electrostatic, charge-resistant, glass-filled, engineered polymer enclosure rated for the respective Electrical Hazard Area Classification as previously specified. The component stand shall allow for up to 4 inches (100 mm) of thermal insulation. Heating cable terminations shall use cold-applied materials and shall not require the use of a heat gun, torch, or hot work permit for installation.

C. Components shall be rated to a minimum installation temperature of minus 40 degrees F, minimum usage temperature of minus 60 degrees F, and a maximum pipe temperature of 482 degrees F.

2.06 GROUND FAULT PROTECTION

A. All heat tracing shall be provided with ground-fault equipment protection as required by National Electrical Code (NEC) Article 427-22. The protection shall be an integral device supplied as part of the heat tracing equipment.

2.07 POWER CONNECTOR

A. Provide power connection boxes for each heat tracing system. Each power connection box shall be designed for the Electrical Hazard Area Classification previously indicated. Each connection box shall include a cold-applied heating cable core seal. Provide all pipe straps, attachment hardware and appurtenances required for installation. Each power connector shall include an indicator light to provide local visual indication of heat tracing system operation. All lights shall become illuminated when the heat tracing system becomes activated.

2.08 GLAND KIT

A. Provide all gland kits for transitions of heating cables into junction boxes. Each gland kit shall be provided with 3/4-inch National Pipe Thread Taper (NPT) connections. Each gland kit shall be designed for the Electrical Hazard Area Classification previously specified. Each gland kit shall include a cold-applied heating cable core seal. A 3 by 12 American Wire Gauge (AWG) terminal block shall be included.

2.09 TEE CONNECTIONS

A. Provide tee and splice connections for each heating cable system. Tee and splice connections shall be designed for up to 3 heating cables. Each tee or splice connection shall be designed for the Electrical Hazard Area Classification previously specified. Each tee and splice connection kit shall include a cold-applied heating cable core seal. Provide 2 pipe straps for installation of each tee or splice connection.

2.10 TAPE

A. Provide glass installation tape for attachment of heat tracing to metallic piping systems. The glass tape shall be specifically rated for use with the respective process pipe material. All tape shall be rated for the process design conditions and temperatures previously specified. Strap all heat tracing to metallic piping with glass tape at a maximum of 1-foot intervals. Minimum application temperature shall be in accordance with the recommendations of the manufacturer.

B. Provide aluminum tape for installation of heat tracing on plastic piping systems. Aluminum tape shall have a minimum temperature class rating of 300 degrees F. Minimum application temperature shall be in accordance with the recommendations of the manufacturer.

2.11 LABELING

A. Provide labeling for all piping systems which include heat tracing. Attach each label to the outside of the insulation jacketing to indicate the presence of electrical heat tracing. Provide 1 label at a maximum spacing of every 10 feet. Labels shall be attached to piping systems in clear visible locations. Provide labels for all systems and piping including piping in vaults and under tank covers.

2.12 LOCAL CONTROLLER AND TEMPERATURE SENSORS

A. Provide electronic thermostat control system for each heat trace system that provides on/off control based on pipe temperature sensor inputs. Controller enclosure shall include LED indicator lamps for operating states of “Power On”, “Heat On”, and “Alarm”

B. Controller temperature control shall include 1.8 degrees F temperature deadband. Control settings shall be factory-programmed.

C. Controller shall have auto-cycle function to monitor ground fault conditions at minimum 24-hour intervals. Ground fault detection shall be integral to controller and configurable for “alarm only” or “alarm and trip” functions.

D. Controller shall accept override input signal via dry contact to allow remote enabling of heat trace by the user.

E. Controller shall utilize up to three (3) thermostat inputs, two (2) for pipe temperature, and one (1) for high temperature limit for plastic piping system protection.

F. Temperature sensors shall consist of RTD with minimum 20-foot length PVC extension lead wires for above-grade piping systems and 50-foot length PVC extension lead wires for below-grade piping systems. Temperature sensors shall be affixed to piping with aluminum foil tape per Manufacturer’s instructions.

G. Controller shall include alarm output relay, configurable for low sensor temperature, high sensor temperature sensor, and ground fault detection. Controller shall include dry contact input for remote alarm reset.

2.13 HARDWARE

A. All bolts, nuts, anchors, washers, appurtenances, and related fastening hardware shall be type 316 stainless steel. All stainless steel components shall be electro-polished or pacified to obtain maximum corrosion resistance. All necessary hardware, attachments, and related appurtenances for installation of all equipment shall be provided. All stainless steel bolts shall comply with ASTM F 593 standards. Stainless steel nuts shall comply with ASTM F 594 standards.

2.14 NAMEPLATES

A. Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, catalog number, rated capacity, voltage, and all other pertinent data on a plate secured to the item of equipment per section 40 00 00 Basic Process Materials and Methods.

2.15 ELECTRICAL WORK

A. All electrical work and controls shall conform to NEMA ICS 1 standards. Provide all controls, as well as wiring for the fully automatic operation of all equipment as shown on the Drawings. The equipment manufacturer shall provide all control wiring diagrams. Submit manufacturers wiring diagrams for review and approval by the Engineer. Electrical equipment and wiring shall be in accordance with the Contract Documents. Electrical characteristics shall be as specified or indicated in

the Contract Documents. All electrical work shall be in accordance with the Contract Documents and NEC standards.

2.16 DESIGN BASIS MANUFACTURER

A. All electrical heat tracing equipment of the same type, style, and duty shall be supplied by a single manufacturer. All heat tracing systems shall be a product of the following manufacturers:

1. Urecon Ltd. Of Quebec, Canada

2. Engineer-Approved Equal

2.17 SPARE PARTS

A. The Manufacturer shall provide the following components, at a minimum, as spare parts:

Item	Quantity
Temperature Sensors	One (1) for above-grade pipe systems One (1) for below-grade pipe systems

2.18 SPECIAL TOOLS

A. Provide 1 set of all special tools required to completely assemble, disassemble, or maintain the equipment. Special tools shall refer to oversized or specially dimensioned tools, special attachments or fixtures, or any similar items. One set of special tools shall be provided for each size of equipment or related system.

2.19 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 INSTALLATION

A. All heat tracing shall be installed in accordance with the written instructions of the manufacturer. Correct installation and assembly of the heat tracing systems and ancillary equipment shall be the Contractor's responsibility. Install all electrical heat tracing in accordance with the Drawings and the manufacturers' installation instruction manual.

B. All appurtenances required for a complete and operating heat tracing system shall be provided, including, but not limited to such items as piping, conduit, wall sleeves, wall pipes, anchors, grouting, drivers, power supply, splices, tees, end

seals, attachment tape, labels, pipe straps, thermostats, and junction boxes. Provide wiring of all heat tracing to junction boxes and power supplies.

3.02 FACTORY TESTING

A. Factory inspections and tests shall be conducted for all self-regulating, power limiting, series constant wattage and constant wattage heat tracing cables. Testing shall be conducted per the latest IEEE Std 515 standards as well as all applicable manufacturer's standards.

3.03 FIELD TESTING

A. The heat tracing system startup and demonstration period shall include but is not limited to that specified.

B. In the field, all heat tracing systems shall be meggered. The following separate field megger readings shall be taken on each heat tracing cable

1. Each heat tracing cable shall be meggered when received at the jobsite before installation.

2. Each heat tracing cable shall be meggered after installation, but before insulation is applied.

3. All heat tracing cable shall be meggered after insulation has been installed.

C. All three of the above field megger readings shall be greater than 20 megohms. Otherwise, the heat tracing is not acceptable and shall be replaced at no additional cost to the Owner or Engineer. Field megger tests shall be recorded for each heat tracing system, and certified reports shall be submitted to the Owner and Engineer by the Contractor.

D. Provide a field demonstration test of all heat tracing systems. Testing shall occur prior to installation of all insulation and jacketing, unless installed as a component of a pre-insulated pipe system. Simulate an air temperature or pipe temperature as necessary below the previously specified minimum criteria. Once the temperature reaches a level below the previously specified minimum value, the amperage draw shall be measured from each heat tracing system to confirm proper operation.

E. Amperage draw values shall be compared to the manufacturer supplied ratings for each system. All heat tracing shall also be tested using a 1,000VDC megger. Minimum heat tracing resistance shall be between 20 to 1,000 megohms regardless of the length. Certified field performance test results shall be submitted to the Owner and Engineer.

3.04 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.05 STARTUP & COMMISSIONING

A. Provide in accordance with Division 01 General Requirements.

3.06 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

SECTION 40 42 13

PROCESS PIPE INSULATION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide process piping insulation in accordance with this Section and applicable reference standards listed in Article 1.03.

2. Provide process piping insulation as specified on the Drawings. Provide all required insulation and accessories, including, but not limited to jackets, covers, coatings, adhesives, fasteners, lagging, mastics, saddle supporting devices, and appurtenances required for complete and operational pipe insulating systems. Where applicable, replace all insulation removed or damaged during construction activities with new insulation of the same thickness and jacket to match the existing conditions of the insulation as was used previously.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment Requirements: Per Division 01 General Requirements.

1.03 REFERENCES

A. Reference Standards

1. ASTM International

a. ASTM A 666 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar

b. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

c. ASTM C 272 Water Absorption of Core Materials for Structural Sandwich Constructions

d. ASTM C 273/ C273M Shear Properties of Sandwich Core Materials

e. ASTM C 518 Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

f. ASTM C 534 Standard Specification for Preformed Flexible Elastomeric Thermal Insulation in Sheet and Tubular Form

g. ASTM C 547 Standard Specification for Mineral Fiber Pipe Insulation

h. ASTM E 96/E 96 M Standard Test Methods for Water Vapor Transmission of Materials

i. ASTM C 203 Breaking Load and Flexural Properties of Block-Type Thermal Insulation

j. ASTM D 792 Density and Specific Gravity (Relative Density) of Plastics by Displacement

k. ASTM C 591 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation

l. ASTM C 795 Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel

m. ASTM D 1621 Compressive Properties of Rigid Cellular Plastics

n. ASTM D 1623 Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics

o. ASTM D 2126 Response of Rigid Cellular Plastics to Thermal and Humid Aging

p. ASTM D 2856 Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer

q. ASTM D 638 Standard Test Method for Tensile Properties of Plastics

r. ASTM C 1136 Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

s. ASTM C 552 Standard Specification for Cellular Glass Thermal Insulation

t. ASTM D 1622 Apparent Density of Rigid Cellular Plastics

u. ASTM D 257 Standard Test Methods for D-C Resistance or Conductance of Insulating Materials

v. ASTM D 790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

w. ASTM E 136 Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C

x. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

y. ASTM G 21 Determining Resistance of Synthetic Polymeric Materials to Fungi

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: Per Division 01 General Requirements.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Product Data

1. Provide catalog cut sheets and dimensional data for pipe insulation, jacketing, covers, coatings, adhesives, fasteners, saddle supporting devices, and appurtenances. Include manufacturer's descriptive data and technical literature for insulation systems. For insulation that will be shipped exposed, provide a description of the protective packaging that will be used during transit.

2. Provide manufacturer’s installation instructions.

C. Closeout and Maintenance Material Submittals: Per Division 01 General Requirements.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: Per Division 01 General Requirements for manufacturing and as follows

1. Materials shall be the standard products of a manufacturer regularly engaged in the production of pipe insulation. The insulation supplied shall essentially duplicate materials that have been in satisfactory use for at least 5 years in identical applications in other wastewater treatment facilities.

2. The insulation manufacturer shall have a minimum of 5 years of documented experience in the design and production of the pipe insulation types specified.

C. Provide final design and installation of all process pipe insulation systems. Conform and correlate all quantities and dimensions of process pipe insulation that is required. Select the appropriate fabrication and techniques of installation for the piping insulation systems. All installations shall be in accordance with the manufacturer's recommendations. Coordinate the Work of all related trades when installing process pipe, appurtenances, and related systems.

D. Multiple manufacturers are indicated as acceptable for each type of insulation in this Specification. The Contractor shall also ensure that all materials used are compatible and in compliance with all applicable codes and standards.

E. The Owner and Engineer shall reserve the right to sample and test any materials after delivery and to reject all components represented by a sample that fails to comply with the requirements of this Specification.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. All insulation materials shall be inspected for size, quality, and quantity against approved submittals upon delivery. Delivery schedule of all insulation shall be coordinated with the Contractor. All insulation shall be protected from moisture, dirt, stones, and contaminants.

C. All insulation materials shall be suitably packed for shipment and long-term storage. Each package shall be labeled to indicate the Project and the contents. All insulation materials shall be stored in a covered dry location off the ground.

1.08 SITE CONDITIONS

A. Existing Conditions: Per Division 01 General Requirements.

1.09 WARRANTY

A. Special Warranty/Extended Correction Period

1. The manufacturer shall provide a full & comprehensive warranty for all insulation, jacketing, and appurtenances specified in this section. The insulation shall be warrantied to be free from defects in workmanship, design, and materials for 1 year. If any parts of the materials supplied under this section should fail during the manufacturer's warranty period, replacement of parts or the materials themselves shall be provided. The materials shall be restored to active working service at no expense to the Owner or Engineer. The manufacturer shall incur all costs, including, but not limited to parts, labor, service, technicians, shipping, and handling required for restoration of the insulation and jacket systems to active service as required under the manufacturer's warranty.

2. The manufacturer's warranty shall commence at the date of substantial completion or partial utilization.

PART 2 – PRODUCTS

2.01 PIPE INSULATION – GENERAL

A. Unless otherwise specified or indicated on the Drawings, all insulation materials, integrated insulation assemblies, adhesives, coatings, and other accessories which are provided shall have flame spread ratings not exceeding 25 (fire resistive). The smoke developed rating shall not exceed 50. The fuel contributed rating shall not exceed 50. The ratings are as established by tests conducted in accordance with Interior Federal Standard No. 00136B, entitled Interior Federal Standard Flame-Spread Properties for Materials and the National Fire Code of the NFPA.

B. The insulation manufacturer shall provide permanent treatment of jackets and facings to impart flame and smoke. The use of water-soluble treatments of jackets and facings is not acceptable.

C. Exceptions are allowed for closed cell foam insulation, 1-piece pre-molded polyvinyl chloride (PVC) fittings, PVC valve covers, PVC pipe jacketing, and asphaltic mastic.

D. Piping insulation products containing Asbestos are not permitted under any circumstances.

E. The toxicity of any solvents used for the piping insulation systems shall not exceed a maximum allowable concentration of 200 ppm or the latest value published by the American Conference of Governmental Industrial Hygienists and OSHA. Use low volatile organic compounds (VOC) solvents whenever possible.

F. The pipe insulation shall be rigid polyisocyanurate foam insulation equal to "Trymer 2500" by Dow Chemical, with the following requirements:

1. Nominal Density (ASTM D1622 @ 74°F): 2.0 lbs./cu. ft.

2. Compressive Strength (ASTM D1621 @ 74°F):

   a. Parallel: 28 psi

   b. Perpendicular: 20 psi

3. Compressive Modulus (ASTM D1621 @ 74°F):

   a. Parallel: 750 psi

   b. Perpendicular: 400 psi

4. Shear Strength (ASTM C273 @ 74°F):

   a. Parallel: 25 psi

   b. Perpendicular: 25 psi

5. Shear Modulus (ASTM C273 @ 74°F):
   a. Parallel: 300 psi
   b. Perpendicular: 300 psi
6. Tensile Strength (ASTM D1623 @ 74°F):
   a. Parallel: 37 psi
   b. Perpendicular: 37 psi
7. Flexural Strength (ASTM C203):
   a. Parallel: 42 psi
8. Flexural Modulus (ASTM C203):
   a. Parallel: 720 psi
9. Thermal Conductivity "k-factor" (ASTM C518 @ 75°F):
   a. Initial: 0.14 BTU in/hr. sq. ft.°F
10. Resistance Value "R-Value" (ASTM C518 @ 75°F):
    a. Initial: 14.3 (2-inch thickness)
    b. Aged: 11.7 (2-inch thickness)
11. Closed Cell Content (ASTM D2856 @ 74°F): 92%
12. Temperature Range: -320°F to 300°F
13. Water Absorption (ASTM D2842): 0.05 psf
14. Coefficient of linear thermal expansion (ASTM D696)
    a. Parallel: 2.9 x 10-5 in/in °F @ 70°F to -320°F
    b. Perpendicular: 4.3 x 10-5 in/in °F @ 70°F to -320°F

G. Thickness: Minimum of 2 inches or as indicated on Drawings.

H. Preinsulated Pipe which meets these specifications and the design shown on the Drawings will be permitted.

I. Provide integral heat trace conduits of the size and quantity necessary to meet the requirements of Section 40 41 13 Process Piping Heat Tracing.

2.02 INSULATION PROTECTIVE JACKET

A. Above-Grade Insulated Pipe

1. Above-Grade Protective Jacket

a. Locked-seam, spiral-wound, round metal jacket

b. Galvanized Steel with a jacket thickness of 22 gauge for pipe systems with outside diameter less than 18 inches, 18 gauge for pipe systems with outside diameter equal or greater than 18 inches.

c. Minimum system compressive strength shall be 200 psi.

d. End caps shall be provided at terminal ends of insulation system. End cap shall be heat-shrinkable cross-linked polyolefin with mastic lining that seals to the respective outer jacket and carrier pipe surface.

B. Below-Grade Insulated Pipe

a. Below-Grade Protective Jacket: Shall include polyethylene jacket of either tape wrap type of extruded sheet system. Material shall be UV-inhibited polyethylene with a minimum thickness of 50 mils and a minimum compressive strength of 60 psi.

b. End caps shall be provided where insulation system terminates below-grade. End cap shall be heat-shrinkable cross-linked polyolefin with mastic lining that seals to the respective outer jacket and carrier pipe surface.

2.03 FASTENING BANDS

A. Provide all fastening bands for insulation jacket and installation of materials as required by the insulation jacket manufacturer.

2.04 ADHESIVES AND COATINGS

A. All lagging adhesives, vapor barrier coatings, vapor seal adhesives, sealing compound adhesives, weatherproof mastics, and vapor barrier materials shall be compatible with the insulation and protective jacket as recommended by the insulation and protective jacket manufacturers. Submit a certified statement attesting to the approval of the adhesive, coating, sealing compound, mastic, and vapor barrier materials by the insulation manufacturer.

B. All adhesives and coatings for pipe insulation of the same type, style, and duty shall be supplied by a single manufacturer. All adhesives, coatings, sealing compounds, mastics, and vapor barriers for process pipe insulation shall be a product of the following manufacturers:

1. Foster Products Company

2. H.B. Fuller Company

3. Childers Products Company

4. Engineer-Approved Equal

2.05 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION

A. Obtain the Engineer's written approval of piping systems prior to the application of insulation. Piping shall not be insulated until testing has been performed on the piping systems as outlined in Section 40 05 13 Process Pipe and Fittings. Piping shall be clean, dry, and painted, if required, prior to insulation application. Insulation shall be clean, dry, and installed, prior to the application of insulation jacket. Short pieces of insulation and jacket materials shall not be used where a full-length section will fit.

B. Provide insulation materials and jackets with smooth and even surfaces, with jackets drawn tight, and secured on longitudinal and end laps. Insulate fittings and piping accessories with pre-molded, precut, or field-fabricated pipe insulation of the same pipe insulation material and thickness as the adjoining pipe insulation. Provide unions, flanges, valves, and piping accessories with removable, snap on sections of insulation. Provide continuous sections of insulation through pipe hangers and pipe supports. Do not step on or walk on insulation or jacket.

C. All insulated piping shall be protected against vapor seal damage at all pipe hangers by use of insulation protection saddles as specified in section 40 05 15 Process Pipe Supports and as shown on the Drawings.

D. Install a continuous insulation protection shield on all insulated piping that passes over electrical enclosures. The shield shall cover a minimum 1/3 of the lower circumference of pipe insulation and be permanently secured to the pipe insulation. The shield length shall extend a minimum of 4 feet beyond the electrical enclosure.

E. Where piping is provided with heat tracing, the insulation shall not be installed until the heat tracing has been tested by the Contractor and accepted to the satisfaction of the Engineer and Owner. Size the insulation to allow for the heat tracing line and all appurtenances without deforming the insulation.

F. Unless otherwise specified or indicated on the Drawings, insulate all valves, fittings, pipe specialties and all other components that are part of the piping system. Insulate valve bonnets to a point just below the stuffing box.

G. Bridge flanges, unions, and pipeline strainers with block or sectional insulation wired in place. The wire shall be 316 stainless steel or other material as directed/approved by the Engineer. Stop all pipe insulation a sufficient distance from pipe flange unions or strainers to allow removal of flange bolts without disturbing the pipe insulation. Extend the block, at least 2 inches over the adjacent

pipe insulation. Flange covers shall be designed for removal without damaging the pipe insulation. Fill all voids with blanket insulation.

H. Where possible, all insulation shall be continuous through wall/floor openings and sleeves.

I. All insulation shall be protected from prolonged exposure to UV light and weather upon installation. In applications with UV exposure all insulation shall be covered with a jacketing material within two weeks of installation to eliminate long term exposure to UV light. Do not use screws, staples or other fasteners on lines containing a vapor retarder system.

3.02 PIPING INSULATION

A. Utilize preformed sectional insulation and jacketing whenever possible. The use of blanket insulation shall only be allowed for fittings that cannot be insulated with sectional insulation. All joints on preformed and fabricated insulation shall be accurately fitted to eliminate voids. Voids shall be eliminated by refitting or replacing the insulation. End joints of all insulation shall be firmly butted to adjoining sections of insulation.

B. Outdoor piping insulation shall be installed to keep the insulation dry at all times. All joints shall be located to prevent the entrance of water. Breaks in jacketing caused by vertical connections or instruments shall be protected by hoods or cones. Where there are breaks in the jacket, plastic moisture barriers shall be provided under the jacketing to protect the insulation. Insulation and jacketing of valves shall be waterproofed. Insulation and jacketing of valves shall be removable to allow servicing of the respective valve.

C. Vapor seal adhesives shall be used to seal seams and butt sections on all cold piping applications if self-sealing laps are not provided. The use of staples or any other fastening methods that could potentially penetrate the vapor barrier shall not be permitted on cold piping systems under any circumstances. Staples may be used on hot piping systems where there is no potential for condensation. All staples shall be 316 stainless steel.

D. Where supports, anchors, or guides are in direct contact with cold piping systems, insulate the item in contact a distance of 4 times the insulation thickness. Clamps and non-welded support devices shall be contained within the insulation. The space within insulating saddles at pipe hangers shall be filled with insulation.

E. On vertical pipe risers exceeding 15 feet in height, provide intermediate support for the insulation. For carbon steel pipe, the supporting shall consist of angle clips or other suitable devices welded to the pipe at approximately 15 feet on center and concealed by the pipe covering. On non-carbon steel piping, clamps or other non-welded devices as approved by the Engineer shall be utilized.

F. In the case of insulated piping runs between 2 different piping systems, the interconnecting line shall be insulated the same as the system having the most rigid insulating requirements. If one of the connecting piping lines is not insulated the interconnecting line shall be insulated the same as the insulated line.

3.03 METALLIC AND PVC INSULATION JACKETING

A. Install all metal or plastic jacketing with joints staggered from those of the piping system insulation. All metallic or plastic jacketing shall have a minimum 3-inch overlap on longitudinal joints and end joints. Longitudinal joints in horizontal piping shall have the outer lap of the joint pointed down to shed water. The end of the outer lap shall be located at the 5 or 7 o'clock positions.

B. Where called for on the Drawings or as specified, provide new piping insulation and existing piping insulation affected by Contractor's operations with an aluminum or PVC jacket. Machine cut the jacket to produce a straight, smooth edge. Lap longitudinal and circumferential seams not less than 3 inches.

C. Install jackets on horizontal piping with the longitudinal seam approximately midway between horizontal centerline and the bottom side of pipe. Install with the top edge of the jacket overlapping the bottom edge of the jacket and with the seam of each jacket offset from the seam of the adjacent jacket. Install jackets on vertical piping and on piping pitched from the horizontal from low point to high point so that the lower circumferential edge of each jacket overlaps the jacket below it. Provide factory prefabricated covers for insulation on fittings, valves, flanges, and other piping appurtenances as required.

D. Finish jackets neatly at pipe hangers and pipe supports. Terminate jackets neatly at the ends of unions, valves, traps, strainers, and other process piping appurtenances. Secure all jacketing with 316 stainless steel bands and hardware spaced not more than 12 inches on center.

3.04 SHEET MEMBRANE JACKET

A. Prior to application, ensure insulation is dry and free of frost or condensation. Apply jacket by cigarette wrapping. Cut membrane to desired length. Ensure length includes a minimum 2-inch overlap. Start by positioning the membrane such that the finished overlap will allow water to drain over and not into the lap.

B. All longitudinal and circumferential seams on exposed piping systems shall be overlapped a minimum of 2 inches. Ensure complete contact at the laps and to the substrate using a roller or firm pressure throughout. Stagger laps of subsequent pieces. All penetrations, insulation supports, valves, expansion and contraction joints, and other protrusions shall be properly flashed to ensure a complete seal between the protrusion and the membrane’s polymer film.

C. On exterior applications, the wrap shall be protected from the sun within a maximum of 14 days exposure. Jacketing shall be applied as soon as possible

to protect the membrane from damage. Consult the manufacturer's recommendations for installation during low temperatures.

D. On below grade applications longitudinal overlaps shall be increased to a minimum of 3 inches. Backfill shall be sand and free of rocks or other objects that may puncture the membrane. Fill containing clay or other materials that may result in sticking to the membrane or shrinking and pulling at seams shall not be used. Where soil stress conditions are possible, on large pipes, an un-adhered layer of polyethylene or other fabric should be placed over the wrap and taped in place prior to backfilling thus allowing for expansion and contraction of the insulation and wrap without pulling at the seams.

E. Use a 4-inch-wide wrap to spiral wrap elbows or cut gores using appropriate templates. Overlap all seams by 50 percent. If mastic is preferred to cover elbows or fittings adjacent to the membrane wrap, do so by extending the mastic and reinforcing mesh a minimum of 2 inches over the wrap facing. Where white solvent-based mastics are desired, tape terminations of sheet membrane with an acrylic pressure sensitive adhesive (PSA) tape to cover the exposed asphalt cut ends. This will prevent bleed through. Mastic and reinforcing mesh should be extended at least 2 inches past edge of PSA tape onto membrane facing.

3.05 FIELD QUALITY CONTROL

A. Provide in accordance with Division 01 General Requirements.

3.06 STARTUP & COMMISSIONING

A. Provide in accordance with Division 01 General Requirements.

3.07 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 01 General Requirements.

END OF SECTION

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COMMITMENT & INTEGRITY DRIVE RESULTS

August 13, 2021
Supersedes June 10, 2021

2020 STANDARD DETAIL UPDATES

Standard Details and Standard Detail updates are available at:
http://maine.gov/mdot/contractors/publications/standarddetail/

Detail #	Description	Revision Date
507(20)	Steel Approach Railing 3-Bar	2/11/2021
507(21)	Steel Approach Railing 3-Bar	2/11/2021
507(22)	Steel Approach Railing 3-Bar	2/11/2021
507(23)	Steel Approach Railing 3-Bar	2/11/2021
507(27)	Steel Approach Railing	2/11/2021
526(01)	Portable Concrete Barrier	1/14/2021
526(01A)	Portable Concrete Barrier	1/14/2021
526(01B)	Portable Concrete Barrier	1/14/2021
526(02)	Portable Concrete Barrier	1/14/2021
526(02A)	Portable Concrete Barrier	1/14/2021
526(03)	Portable Concrete Barrier	1/14/2021
526(04)	Portable Concrete Barrier	1/14/2021
526(04A)	Portable Concrete Barrier	1/14/2021
526(04B)	Portable Concrete Barrier	1/14/2021
603(10)	Concrete Pipe Ties	6/10/2021
605(01)	Underdrain	8/02/2021
606(23)	Standard Bridge Transition – Type “1”	2/11/2021
606(24)	Standard Bridge Transition – Type “1A”	2/11/2021
608(02)	Detectable Warnings	6/10/2021
609(09)	Precast Concrete Vertical Curb	2/11/2021
643(11)	ATCC Cabinet	12/14/2020
801(11)	Pedestrian Ramp Notes	6/10/2021
801(12)	Pedestrian Ramp Requirements	8/02/2021
801(13)	Ramp Length Table	6/10/2021
801(14)	Parallel Pedestrian Ramp	6/10/2021
801(15)	Perpendicular Pedestrian Ramp – Option 1	6/10/2021
801(16)	Parallel Pedestrian Ramp – Option 2A	6/10/2021
801(17)	Perpendicular Pedestrian Ramp – Option 2A	6/10/2021
801(18)	Parallel Pedestrian Ramp – Option 2B	6/10/2021

801(19)	Perpendicular Pedestrian Ramp – Option 2B	6/10/2021
801(20)	Parallel Pedestrian Ramp – Option 3	6/10/2021
801(21)	Perpendicular Pedestrian Ramp – Option 3	6/10/2021
801(22)	Side Street Pedestrian Ramp	6/10/2021
801(23)	Parallel Pedestrian Ramp – Esplanade	6/10/2021
801(24)	Perpendicular Pedestrian Ramp – Esplanade	6/10/2021
801(25)	Island Crossings	6/10/2021
801(26)	Blended Transition	6/10/2021
801(27)	Pedestrian Ramp Adjacent to Driveway or Entrance	6/10/2021
802(05)	Roadway Culvert End Slope Treatment	1/03/2017

SUPPLEMENTAL SPECIFICATIONS

(Corrections, Additions, & Revisions to Standard Specifications – March 2020)

SECTION 102
BIDDING

102.11 Bid Responsiveness Revise the paragraph that states "The Bid is not signed by a duly authorized representative of the Bidder." So that it reads:

"**The Bid is not signed by a duly authorized representative of the Bidder.**

- **Properly submitted electronic bids meet this requirement.**
- **Paper bids must include at least one signed copy of the Contract Agreement Offer & Award form**."

SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES

104.2.1 Furnishing of Right-of-Way Revise the last sentence in the first paragraph by removing "105.4.5 – Special Detours" and replacing it with "**105.4.5 – Maintenance of Existing Structures**.".

SECTION 106
QUALITY

106.6 Acceptance Revise this Subsection by replacing the paragraph beginning with "Acceptance of Hot Mix Asphalt Pavement will be based" with:

> **"Acceptance of Hot Mix Asphalt Pavement will be based on Method A or C Statistical Acceptance, or Method B or D Acceptance as specified. The method of acceptance for each item is defined in Special Provision, Section 403, Hot Mix Asphalt Pavement. When items of Hot Mix Asphalt Pavement are not so designated, Method A will be utilized whenever there are more than 1000 tons per Hot Mix Asphalt Pavement item, and Method B will be utilized when there are less than or equal to 1000 tons per Hot Mix Asphalt Pavement item."**

Revise Subsection "B" by removing it and replacing it with:

> **"B. Items not designated for Statistical Acceptance will utilize Method B or D Acceptance testing to validate the quality of the material incorporated into the Project. For material paid under Item 403.209 – Method D, or designated to be visually accepted, the Contractor shall provide the Department with a Certification Letter that indicates that the material supplied complies with the Specifications. Test results representative of the certified material shall be attached to the letter.**

The Department will randomly sample and test the certified Material for properties noted in Table 1 of Section 502 - Structural Concrete or Table 14 of Section –401.21 Acceptance Method B & D. Material will be subject to rejection as noted in Structural Concrete Section 502.195 - Quality Assurance Method C Concrete or Hot Mix Asphalt, Section 401.2022 Pay Adjustment – Method B & D."

106.7.1 Standard Deviation Method Revise 106.7.1, subsection H by removing the following from the first paragraph:

"Method B: PF = [70 + (Quality Level * 0.33)] * 0.01"

SECTION 110
INDEMNIFICATION, BONDING, AND INSURANCE

110.3.9 Administrative & General Provisions Amend this subsection by adding "**Automobile Liability**" under letter A) Additional Insured to the list of exceptions.

SECTION 206
STRUCTURAL EXCAVATION

206.01 Description – *Structural Earth Excavation, Below Grade* delete the entire sentence and replace with "**shall consist of the removal of excavation required for unknown or unanticipated subsurface condition. See 206.04 – Method of Measurement for pay limits**."

206.04 Method of Measurement – Drainage and Minor Structures Paragraph 1, sentence 2, delete the remainder of the sentence beginning with "….provided the maximum allowable…"

And replace with: **"….in accordance with the following limits:"**

- **Vertical pay limits:**
  - **Below a plane parallel with and 12 inches below the bottom of the drainage or minor structure or**
  - **Below the excavation limits shown in the Bid Documents; whichever is greater.**

- **Horizontal pay limits – The maximum allowable horizontal dimensions shall not exceed those bounded by vertical surfaces 18 inches outside the base, or extreme limits of, the structure, and to the vertical neat lines of underdrain trenches, as shown in the Contract Documents.**

SECTION 401
HOT MIX ASPHALT PAVEMENT

401.19 Contractor Quality Control Amend this Section by adding the following to the end:

"Failure to comply with the approved QCP will result in work suspension and pay reductions as outlined in Section 106.4.6. The Quality Control Plan Value shall be the total bid value for all items covered by the QCP as identified in Special Provision 403."

SECTION 502
STRUCTURAL CONCRETE

502.09 Forms and Falsework Amend this subsection by adding the subsection title "**502.10 Placing Concrete**" after section "D" Removal of Forms and False work" and after the paragraph beginning with "2. Forms and False work, including blocking…". So that a new subsection starts and reads:

"**502.10 Placing Concrete**

A. **General Concrete shall not be placed until forms** …."

502.1701 Quality Control, Method A and B Revise this Section so that the first paragraph and the first sentence of the second paragraph read:

"**502.17 Quality Control The Contractor shall control the quality of the concrete through testing, inspection, and practices which shall be described in the QCP, sufficient to assure a product meeting the Contract requirements. The QCP shall meet the requirements of Section 106, Quality, and this specification. No work under this item shall proceed until the QCP is submitted to and approved by the Department. Failure to comply with the approved QCP will result in work suspension and pay reductions as outlined in Section 106.4.6. The Quality Control Plan Value shall be the total bid value for all cast-in-place items covered by the QCP, using the P value listed in Special Provision 502. If no P value is listed, a value of $350, or bid value per cubic yard, whichever is less, shall be used.**

502.1701 Quality Control, Method A and B The QCP shall address all elements that affect the quality of the structural concrete including, but not limited to, the following: "

502.18, Method of Measurement, Revise Subsection 'F' by removing the word 'transverse' so that it reads: "**Saw cut grooving of concrete wearing surfaces, complete and accepted, will be measured for payment as one lump sum**."

502.19, Basis of Payment, Revise the third paragraph by removing the word 'transverse' so that it reads: "**Saw cut grooving of concrete wearing surfaces will be paid for at the Contract Lump Sum Price, which shall be payment for furnishing all materials, labor, and equipment, including depth gauges and all incidentals, to satisfactorily complete the work."**

(Also see 535.24 and 535.25 for related changes)

SECTION 506
SHOP APPLIED PROTECTIVE COATING – STEEL

506.13 Surface Preparation Amend this section by adding this paragraph to the end:

"**Steel shall meet the requirements of SSPC SP8 Pickling prior to being immersed in the zinc tanks. Verification of the surface preparation shall be included in the QC documentation**."

SECTION 523
BEARINGS

523.22 Fabrication Amend this subsection by adding the following: "**Elastomeric Bearings shall be fabricated in accordance with AASHTO M251."**

SECTION 526
CONCRETE BARRIER

Amend this section by deleting it in its entirety and replacing it with:

"**526.01 Description This work shall consist of the furnishing, constructing, erecting, setting, resetting, and removal of concrete barrier and associated elements in accordance with these specifications, the Standard Details, and the lines and grades shown on the Plans or established by the Resident.**

The types of concrete barrier are designated as follows:

Portable Concrete Barrier Type I Double faced removable barrier in accordance with the Standard Details.

Permanent Concrete Barrier Type II Double faced barrier as shown on the Plans.

Permanent Concrete Barrier Type IIIa Single faced barrier 32 inches high in accordance with the Standard Details or as shown on the Plans.

Permanent Concrete Barrier Type IIIb Single faced barrier 42 inches high in accordance with the Standard Details or as shown on the Plans.

Permanent Concrete Transition Barrier Barrier of various heights joining steel bridge rail to steel guardrail in accordance with the Standard Details or as shown on the Plans.

Permanent Texas Classic Rail Barrier Traffic rail or sidewalk rail, in accordance with the Standard Details or as shown on the Plans.

526.02 Materials

a. Concrete Concrete for barriers, both permanent and portable, shall have a design strength of 5,000 psi.

For cast-in-place barrier: The concrete shall be Class LP, in accordance with Standard Specification Section 502, Structural Concrete.

For precast barrier: The concrete shall meet the requirements of Standard Specification 712.061, Structural Precast Concrete Units, except that the stripping strength for precast barriers is 4,000 psi.

b. Reinforcing Steel Reinforcing steel shall meet the requirements of Section 503, Reinforcing Steel.

c. Structural Steel Plates and barrier connections shall meet the requirements specified in Standard Specification 504 - Structural Steel and shall be hot dip galvanized after fabrication in accordance with Standard Specification 506, Shop Applied Protective Coating – Steel

d. Bolts Bolts shall meet the requirements specified in Section 713.02, High Strength Bolts.

e. Connecting Pins for Portable Concrete Barrier Portable concrete barriers must be connected using a 1- inch diameter pin. The connecting pin must be smooth, not deformed, i.e., reinforcing bar may not be used, and shall meet the strength requirements of ASTM A449 steel. Materials with greater strength may be used with the approval of the Department.

f. Anchor Pins for Portable Concrete Barrier Anchoring to concrete or asphalt will be required when specified on the Plans. When required, portable concrete barriers must be anchored using a 1 ½ - inch diameter anchor pin. The anchor pin must be smooth, not deformed, i.e., reinforcing bar may not be used, and shall meet the strength requirements of ASTM A36 steel. Materials with greater strength may be used with the approval of the Department.

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

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

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

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

526.03 Construction Requirements

Cast-in-place barriers shall be fabricated in accordance with Standard Specification Section 502, Structural Concrete. Precast barriers shall be fabricated in accordance with Standard Specification 534, Precast Structural Concrete.

Concrete finish for permanent barrier shall be rubbed as defined in Standard Specification Section 502, Structural Concrete, 502.13 D2 or an approved equal.

Portable concrete barrier shall be generally free from fins and porous areas and shall present a neat and uniform appearance.

Permanent barrier shall have a protective coating applied in accordance with Standard Specification Section 515, Protective Coating for Concrete Surfaces.

Reflective delineators for concrete median barrier shall meet the requirements of Special Provision 645, Highway Signing.

Preformed Joint Filler shall meet the requirements specified in Subsection 705.01, Preformed Expansion Joint Filler.

Permissible dimensional tolerances for all concrete barriers shall be as follows:

a. Cross-sectional dimensions shall not vary from design dimensions by more than ¼ inch. The vertical centerline shall not be out of plumb by more than ¼ inch.

b. Longitudinal dimensions shall not vary from the design dimensions by more than ¼ inch per 10 feet of barrier section and shall not exceed ¾ inches per section.

c. Location of anchoring holes shall not vary by more than ½ inch from the dimensions shown in the concrete barrier details on the Plans.

d. Surface straightness shall not vary more than ¼ inch under a 10-foot straightedge.

e. The barrier shall have no significant cracking. Significant cracking is defined as fractures or cracks passing through the section, or any continuous crack extending for a length of 12 inches or more, regardless of position in the section.

526.04 Method of Measurement Permanent Concrete Barrier Type II, IIIa, IIIb, Texas Classic Rail, and Precast Median Barrier will be measured for payment by lump sum, complete in place.

Portable concrete barrier, both anchored and unanchored will be measured for payment by lump sum. Lump sum measurement will include verification of the installation and removal of all portable concrete at the completion of the Contractor's operations.

The Contractor shall replace sections of portable concrete barrier, including anchored barrier damaged by the traveling public when directed by the Resident. Replacement sections will be measured for payment in accordance with Standard Specification 109.7, Equitable Adjustments to Compensation and Time.

Transition barrier will be measured by each, complete in place.

526.05 Basis of Payment The accepted quantities of Concrete Barrier Type II, IIIa, IIIb, Texas Classic Rail, and Precast Median Barrier will be paid for at the Contract lump sum price for the type specified, complete in place.

The accepted quantities of Portable Concrete Barrier Type I, both anchored and unanchored will be paid for at the Contract lump sum price. Such payment shall be full compensation for furnishing all materials, assembling, moving, resetting, transporting, temporarily storing, removing barrier, furnishing new parts as necessary, and all incidentals necessary to complete the work.

Portable barrier shall become the property of the Contractor upon completion of the use of the barrier on the project and shall be removed from the project site by the Contractor.

Transition barrier will be paid for at the Contract price each, complete in place.

The accepted quantity of all types of concrete barrier, whether portable or permanent, will be paid for at the lump sum or per each price, as applicable, which payment shall be full compensation for all materials, including reinforcing steel, protective coating, reflective delineators, steel plates and hardware, equipment, labor and incidentals required, as necessary, to complete the work.

Payment will be made under:

	Pay Item	Pay Unit
526.301	Portable Concrete Barrier, Type I	Lump Sum
526.304	Portable Concrete Barrier, Anchored Type I	Lump Sum
526.312	Permanent Concrete Barrier Type II	Lump Sum
526.321	Permanent Concrete Barrier Type IIIa	Lump Sum
526.323	Texas Classic Rail	Lump Sum
526.331	Permanent Concrete Barrier Type IIIb	Lump Sum
526.34	Permanent Concrete Transition Barrier	Each
526.502	Precast Concrete Median Barrier	Lump Sum"

SECTION 527

ENERGY ABSORBING UNIT

527.02 Materials Amend this section by deleting it in its entirety and replacing it with:

"**MaineDOT is transitioning to MASH2016 criteria for Work Zone Traffic Control Devices on the following schedule:**

Portable Crash Cushions will be crash tested and/or evaluated to MASH2016 criteria by January 1, 2030. Current Category 3 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2029.

Work Zone Crash Cushions shall be selected from the Department's Qualified Products List of Crash Cushions/Impact Attenuators or approved equal."

SECTION 535
PRECAST, PRESTRESSED CONCRETE SUPESTRUCTURE

535.24, Installation of Slabs, Beams, and Girders Revise the 5th paragraph by replacing "6.0 and 9.0" to "5.0 and 8.0" so it reads: **"Ready mixed grout shall achieve a design compressive strength of 6,000 psi at 28 days, have an entrained air content of between 5.0 and 8.0 percent, be non-shrink, flowable, and contain a non-shrink additive listed on the Department QPL for expansive cements."**

535.25, Installation of Precast/Prestressed Deck Panels Revise the 2nd paragraph by replacing "6.0 and 9.0" to "5.0 and 8.0" so it reads: **"Ready mixed grout shall achieve a design compressive strength of 6,000 psi at 28 days, have an entrained air content of between 5.0 and 8.0 percent, be non-shrink, flowable, and contain a non-shrink additive listed on the Department QPL for expansive cements."**

SECTION 606
GUARDRAIL

Amend this section by replacing it with the following:

606.01 Description This work shall consist of furnishing and installing guardrail components in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans or as established. Guardrail is designated as:

31" W-Beam Guardrail - Mid-Way Splice
Galvanized steel w-beam, 8" wood or composite offset blocks, galvanized steel posts

Thrie Beam
Galvanized steel thrie beam, 8" wood or composite offset blocks, galvanized steel posts

Median guardrail shall consist of two beams of the above types, mounted on single posts.

Bridge mounted guardrail shall consist of furnishing all labor, materials, and equipment necessary to install guardrail as shown on the plans. This work shall also include drilling for and installation of offset blocks if specified, and incidental hardware necessary for satisfactory completion of the work.

Remove and Reset and Remove, Modify, and Reset guardrail shall consist of removing the existing designated guardrail and resetting in a new location as shown on the plans or directed by the Resident. Remove, Modify, and Reset guardrail and Modify guardrail include the following guardrail modifications: Removing plate washers at all posts, except at anchorage assemblies as noted on the Standard Details, adding offset blocks, and other modifications as listed in the Construction Notes or General Notes. Modifications shall conform to the guardrail Standard Details.

Bridge Connection shall consist of the installation and attachment of beam guardrail to the existing bridge. This work shall consist of constructing a concrete end post or modifying an existing end post as required, furnishing, and installing a terminal connector, necessary hardware, and incidentals required to complete the work as shown on the plans. Bridge Transition shall consist of a bridge connection and furnishing and installing guardrail components as shown in the Standard Details.

606.02 Materials Materials shall meet the requirements specified in the following Sections of Division 700 - Materials:

Timber Preservative	708.05
Metal Beam Rail	710.04
Guardrail Posts	710.07
Guardrail Hardware	710.08

Guardrail components shall meet the applicable standards of "A Guide to Standardized Highway Barrier Hardware" prepared and approved by the AASHTO-AGC-ARTBA Joint Cooperative Committee, Task Force 13 Report.

Posts for underdrain delineators shall be “U” channel steel, 8 ft long, 2 ½ lb/ft minimum and have 3/8-inch round holes, 1-inch center to center for a minimum distance of 2 ft from the top of the post.

Reflectorized Flexible Guardrail Markers shall be mounted on all guardrails. A marker shall be mounted onto guardrail posts at the flared guardrail terminal end point and tangent point, both at the leading and trailing ends of each run of guardrail. The marker’s flexible posts shall be gray with either silver-white or yellow reflectors (to match the edge line striping) at the tangents, red at leading ends, and green at trailing ends. Whenever the guardrail terminal is not flared, markers will only be required at the terminal end point. These shall be red or green as appropriate. Markers shall be installed on the protected side of guardrail posts unless otherwise approved by the Resident. Reflectorized flexible guardrail markers shall be from the Department’s Qualified Products List of Delineators. The marker shall be gray, flexible, durable, and of a non-discoloring material to which 3-inch by 9-inch reflectors shall be applied, and capable of recovering from repeated impacts and meeting MASH 16 requirements. Reflective material shall meet the requirements of Section 719.01 for ASTM D 4956 Type III reflective sheeting. The marker shall be secured to the guardrail post with two fasteners, as shown in the Standard Details.

Reflectorized beam guardrail ("butterfly"-type) delineators shall be mounted on all "w"-beam guardrail. The delineators shall be mounted within the guardrail beam at guardrail posts. Delineators shall be fabricated from high-impact, ultraviolet & weather resistant thermoplastic. Reflectorized beam guardrail delineators shall be placed at approximately 62.5 ft intervals or every tenth post on tangents and at approximately 31.25 ft intervals or every fifth post on curves. Exact locations of the delineators shall be as directed by the Resident. On divided highways, the left-hand delineators shall be yellow, and the right-hand delineators shall be silver/white. On two directional highways, the right-hand side shall be silver/white, and no reflectorized delineator used on the left. All reflectors shall have reflective sheeting applied to only one side of the delineator facing the direction of traffic as shown in the Standard Details. Reflectorized sheeting for guardrail delineators shall meet the requirements of Section 719.01.

Single wood post shall be of cedar, white oak, or tamarack, well-seasoned, straight, and sound and have been cut from live trees. The outer and inner bark shall be removed, and all knots trimmed flush with the surface of the post. Posts shall be uniform taper and free of kinks and bends.

Single steel post shall conform to the requirements of Section 710.07 b.

Single steel pipe post shall be galvanized, seamless steel pipe conforming to the requirements of ASTM A120, Schedule No. 40, Standard Weight.

Acceptable multiple mailbox assemblies shall be listed on the Department's Qualified Products List and shall be MASH 16 tested and approved.

Flared and Tangent w-beam guardrail terminals and guardrail offset blocks shall be from the Department's Qualified Products List. Flared terminals shall be installed with a 4 ft offset as shown in the Manufacturer's installation instructions.

Anchorage assemblies used to anchor trailing ends, radius guardrail, or other ends not exposed to traffic shall meet the applicable standards of "A Guide to Standardized Highway Barrier Hardware" prepared and approved by the AASHTO-AGC-ARTBA Joint Cooperative Committee, Task Force 13 Report, Drawing SEW02a.

Existing materials damaged or lost during adjusting, removing and resetting, or removing, modifying, and resetting, shall be replaced by the Contractor without additional compensation. Existing guardrail posts and guardrail beams found to be unfit for reuse shall be replaced when directed by the Resident.

606.03 Posts Posts for guardrail shall be set plumb in holes or they may be driven if suitable driving equipment is used to prevent battering and distorting the post. When posts are driven through pavement, the damaged area around the post shall be repaired with approved bituminous patching. Damage to lighting and signal conduit and conductors shall be repaired by the Contractor.

When set in holes, posts shall be on a stable foundation and the space around the posts, backfilled in layers with suitable material, thoroughly tamped.

The reflectorized flexible guardrail markers shall be set plumb with the reflective surface facing the oncoming traffic. Markers shall be installed on the protected side of guardrail posts. Markers, which become bent or otherwise damaged, shall be removed and replaced with new markers.

Single wood posts shall be set plumb in holes and backfilled in layers with suitable material, thoroughly tamped. The Resident will designate the elevation and shape of the top. The posts, that are not pressure treated, shall be painted two coats of good quality oil base exterior house paint.

Single steel posts shall be set plumb in holes as specified for single wood posts or they may be driven if suitable driving equipment is used to prevent battering and distorting the post.

Additional bolt holes required in existing posts shall be drilled or punched, but the size of the holes shall not exceed the dimensions given in the Standard Details. Metal around the holes shall be thoroughly cleaned and painted with two coats of approved aluminum rust resistant paint. Holes shall not be burned.

606.04 Rails Brackets and fittings shall be placed and fastened as shown on the plans. Rail beams shall be erected and aligned to provide a smooth, continuous barrier. Beams shall be lapped with the exposed end away from approaching traffic.

End assemblies shall be installed as shown on the plans and shall be securely attached to the rail section and end post.

All bolts shall be of sufficient length to extend beyond the nuts but not more than ½ inch. Nuts shall be drawn tight.

Additional bolt holes required in existing beams shall be drilled or punched, but the size of the holes shall not exceed the dimensions given in the Standard Details. Metal around the holes shall be thoroughly cleaned and painted with two coats of approved aluminum rust resistant paint. Holes shall not be burned.

606.045 Offset Blocks The same offset block material is to be provided for the entire project unless otherwise specified.

606.05 Shoulder Widening At designated locations the existing shoulder of the roadway shall be widened as shown on the plans. All grading, paving, seeding, and other necessary work shall be in accordance with the Specifications for the type work being done.

606.06 Mail Box Post Single wood post shall be installed at the designated location for the support of the mailbox. The multiple mailbox assemblies shall be installed at the designated location in accordance with the Standard Details and as recommended by the Manufacturer. Attachment of the mailbox to the post will be the responsibility of the home or business owner.

606.07 Abraded Surfaces All galvanized surfaces of new guardrail and posts, which have been abraded so that the base metal is exposed, and the threaded portions of all fittings and fasteners and cut ends of bolts shall be cleaned and painted with two coats of approved rust resistant paint.

606.08 Method of Measurement Guardrail will be measured by the linear foot from center to center of end posts along the gradient of the rail except where end connections are made to masonry or steel structures, in which case measurement will be as shown on the plans. When connected to radius rail, measurement will be to the end of the last tangent beam.

Guardrail terminal, reflectorized flexible guardrail marker, terminal end, anchorage assembly, bridge transition, bridge connection, multiple mailbox post, and single post will be measured by each unit of the kind specified and installed.

Widened shoulder will be measured as a unit of grading within the limits shown on the plans.

Excavation in solid rock for placement of posts will be paid under force account unless otherwise indicated in the Bid Documents.

606.09 Basis of Payment The accepted quantities of guardrail will be paid for at the contract unit price per linear foot for the type specified, complete in place. Reflectorized beam guardrail ("butterfly"-type) delineators will not be paid for directly but will be considered incidental to guardrail items. Reflectorized flexible guardrail marker, terminal end, anchorage assembly, bridge transition, bridge connection, multiple mailbox post, and single post will be paid for at the contract unit price each for the kind specified complete in place.

Guardrail terminals will be paid for at the contract price each, complete in place which price shall be full payment for furnishing and installing all components including the terminal section, posts, offset blocks, "w" beam, cable foundation posts, plates and for all incidentals necessary to complete the installation within the limits as shown on the Standard Details or the Manufacturer's installation instructions. Pay limits for a flared terminal will be 37.5 feet. Pay limits for a tangent terminal will be 50 feet. Each guardrail terminal will be clearly marked with the Manufacturer's name and model number to facilitate any future needed repair. Such payment shall also be full compensation for furnishing all material, excavating, backfilling holes, assembling, and all incidentals necessary to complete the work, except that for excavation for posts or anchorages in solid ledge rock, payment will be made under 109.7.5 – Force Account. Type III Retroreflective Adhesive Sheeting shall be applied to the approach buffer end sections and sized to substantially cover the end section. On all roadways, the ends shall be marked with alternating black and retroreflective yellow stripes. The stripes shall be 3 in wide and sloped down at an angle of 45 degrees toward the side on which traffic is to pass the end section. Guardrail terminals shall also include a set of installation drawings supplied to the Resident.

Anchorages to bridge end posts will be part of the bridge work. Connections thereto will be considered included in the unit bid price for guardrail.

Guardrail to be placed on a radius of curvature of 150 ft or less will be paid for under the designated radius pay item for the type guardrail being placed.

Widened shoulder will be paid for at the contract unit price each complete in place and will be full compensation for furnishing and placing, grading and compaction of aggregate subbase and any required fill material.

Adjust guardrail will be paid for at the contract unit price per linear foot and will be full compensation for adjusting to grade. Payment shall also include adjusting guardrail terminals where required.

Modify guardrail will be paid for at the contract unit price per linear foot and will be full compensation for furnishing and installing offset blocks, additional posts, and other specified modifications; removing, modifying, installing, and adjusting to grade existing posts and beams; removing plate washers and backup plates, and all incidentals necessary to complete the work. Payment shall also include removing and resetting guardrail terminals where required.

Remove and Reset guardrail will be paid for at the contract unit price per linear foot and will be full compensation for removing, transporting, storing, reassembling all parts, necessary cutting, furnishing new parts when necessary, reinstalling at the new location, and all other incidentals necessary to complete the work. Payment shall also include removing and resetting guardrail terminals when required.

Remove, Modify, and Reset guardrail will be paid for at the contract unit price per foot and will be full compensation for the requirements listed in Modify guardrail and Remove and Reset guardrail.

Bridge Connections will be paid for at the contract unit price each. Payment shall include, attaching the connection to the endpost including furnishing and placing concrete and reinforcing steel necessary to construct new endposts if required, furnishing and installing the terminal connector, and all miscellaneous hardware, labor, equipment, and incidentals necessary to complete the work.

Bridge Transitions will be paid for at the contract unit price each. Payment shall include furnishing and installing the thrie beam or "w"-beam terminal connector, doubled beam section, and transition section, where called for, posts, hardware, precast concrete transition curb, and any other necessary materials and labor, including the bridge connection as stated in the previous paragraph.

No payment will be made for guardrail removed, but not reset and all costs for such removal shall be considered incidental to the various contract pay items.

Payment will be made under:

Pay Item		Pay Unit
606.1301	31" W-Beam Guardrail - Mid-Way Splice – Single Faced	Linear Foot
606.1302	31" W-Beam Guardrail - Mid-Way Splice – Double Faced	Linear Foot
606.1303	31" W-Beam Guardrail - Mid-Way Splice, 15' Radius and Less	Linear Foot
606.1304	31" W-Beam Guardrail - Mid-Way Splice, Over 15' Radius	Linear Foot
606.1305	31" W-Beam Guardrail - Mid-Way Splice Flared Terminal	Each
606.1306	31" W-Beam Guardrail - Mid-Way Splice Tangent Terminal	Each
606.1307	Bridge Transition (Asymmetrical) – Type IA	Each
606.1721	Bridge Transition - Type I	Each
606.1722	Bridge Transition - Type II	Each
606.1731	Bridge Connection - Type I	Each

606.1732	Bridge Connection - Type II	Each
606.178	Guardrail Beam	Linear Foot
606.25	Terminal Connector	Each
606.257	Terminal Connector - Thrie Beam	Each
606.259	Anchorage Assembly	Each
606.265	Terminal End-Single Rail - Galvanized Steel	Each
606.266	Terminal End-Single Rail - Corrosion Resistant Steel	Each
606.275	Terminal End-Double Rail - Galvanized Steel	Each
606.276	Terminal End-Double Rail - Corrosion Resistant Steel	Each
606.353	Reflectorized Flexible Guardrail Marker	Each
606.354	Remove and Reset Reflectorized Flexible Guardrail Marker	Each
606.356	Underdrain Delineator Post	Each
606.358	Guardrail, Modify	Linear Foot
606.362	Guardrail, Adjust	Linear Foot
606.365	Guardrail, Remove, Modify, and Reset	Linear Foot
606.366	Guardrail, Remove and Reset	Linear Foot
606.367	Replace Unusable Existing Guardrail Posts	Each
606.47	Single Wood Post	Each
606.48	Single Galvanized Steel Post	Each
606.50	Single Steel Pipe Post	Each
606.51	Multiple Mailbox Support	Each
606.568	Guardrail, Modify - Double Rail	Linear Foot
606.63	Thrie Beam Rail Beam	Linear Foot
606.64	Guardrail Thrie Beam - Double Rail	Linear Foot
606.65	Guardrail Thrie Beam - Single Rail	Linear Foot
606.66	Terminal End Thrie Beam	Each
606.70	Transition Section - Thrie Beam	Each
606.71	Guardrail Thrie Beam - 15 ft radius and less	Linear Foot
606.72	Guardrail Thrie Beam - over 15 ft radius	Linear Foot
606.73	Guardrail Thrie Beam - Single Rail Bridge Mounted	Linear Foot
606.74	Guardrail - Single Rail Bridge Mounted	Linear Foot
606.753	Widen Shoulder for Low Volume Guardrail End	Each
606.754	Widen Shoulder for Flared Guardrail Terminal	Each
606.78	Low Volume Guardrail End	Each
606.80	Buried-in-Slope Guardrail End	Each

SECTION 609
CURB

609.02 Materials Revise the paragraph beginning "The Contractor shall submit a concrete mix…" so that it reads:

"**The Contractor shall submit a concrete mix design for the Portland Cement Concrete to the Resident, with a minimum designed compressive strength of 3000 psi concrete fill**."

609.03 Vertical Stone Curb, Terminal Section and Transition Sections and Portland Cement Concrete Curb, Terminal Sections and Transition Sections Revise this section by underlining the section number and title so that it reads in the spec book as:

"**609.03 Vertical Stone Curb, Terminal Section and Transition Sections and Portland Cement Concrete Curb, Terminal Sections and Transition Sections**"

Revise the last paragraph beginning with "The Contractor may elect…" so that it reads:

"The Contractor may elect to substitute concrete to backfill Stone Curbing or Stone Edging at their option. If the concrete backfill option is elected, the Concrete Fill shall **meet the requirements of 609.02."**

SECTION 610
STONE FILL, RIPRAP, STONE BLANKET, AND STONE DITCH PROTECTION

610.02 Materials Amend this subsection by adding the following to the end of the material list:
"**Stone Ditch Protection 703.29"**

SECTION 618
SEEDING

618.08 Mulching Revise this Section so that the third sentence reads: "Mulch for Seeding Method Number 1 shall only be cellulous fiber mulch Section 619.04 **(b)** or straw mulch Section 619.04 (**a**)."

SECTION 619
MULCH

619.03 General Amend this Section by adding the following sentence to the end: **"Straw mulch shall be used in all wetland areas."**

SECTION 626
FOUNDATIONS, CONDUIT, AND JUNCTION BOXES FOR HIGHWAY SIGNING, LIGHTING, AND SIGNALS

626.034 Concrete Foundations Revise this Section by changing '626.037' to '**626.036**' in the Second Paragraph which begins with "Foundations shall consist of cast-in-place…".

Revise the 10th paragraph beginning with "Before placing concrete, the required elbows…" by removing "…**in accordance with Standard Specification 633**."

626.036 Precast Foundations Revise the last sentence of paragraph one so that it reads: "**Construction of precast foundations shall conform to the Standard Details and all requirements of 712.061**."

SECTION 627
PAVEMENT MARKINGS

627.06 Application Revise this subsection by replacing the paragraph beginning with " On other final pavement markings…" with the following:
"On other final pavement markings and on curb, where the paint is applied by hand painting or spraying, application shall be one uniform covering coat at least 16 mils thick. Before the paint has dried, the glass beads shall be applied by a pressure system that will force the glass beads onto the undried paint as uniformly as possible.

Painted lines and markings shall be applied in accordance with the manufacturer's published recommendations. These recommendations will be supplied to the Resident prior to installation."

SECTION 643
TRAFFIC SIGNALS

643.021 Materials Amend this subsection by adding the following at the end:

"**MaineDOT is transitioning to MASH2016 criteria for Work Zone Traffic Control Devices on the following schedule:**

Temporary Traffic Control Signals will be crash tested and/or evaluated to MASH2016 criteria by January 1, 2030. Current Category 4 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2029."

643.09 Service Connection Revise this subsection by removing the paragraph that begins with "Traffic signal services shall have…".

And by removing the paragraphs beginning with " A service ground rod shall be installed…" and "A total of 4, 10' service…" and replace them with "**A total of 4, 10' service ground rods shall be installed and properly connected together on the outside of the cabinet foundation. One ground rod shall be located at each corner and shall be either flush or slightly below finished grade. The connection between the ground rod and the ground wire shall be an exothermic connection such as a Cadweld. The ground wire from the interconnected ground rods shall be routed through a conduit in the foundation and into the base of the cabinet**".

SECTION 645

HIGHWAY SIGNING

Section 645.023 Sign Support Structures. Under letter "c.", revise the fifth paragraph beginning with "In addition to the required details…" by removing the words "**and foundation**" from the 5th sentence.

Section 645.08 Method of Measurement. Revise the second paragraph beginning with "Bridge-type, cantilever and…" by removing the words "**including the foundation**" .

Section 645.09 Basis of Payment. Revise the third paragraph beginning with "The accepted bridge-type, cantilever and…" by removing the word "**foundation**" from the second sentence. Add the following sentence to the end of the paragraph "**Conduits, Junction Boxes, and Foundations will be paid for under Section 626.**"

SECTION 652
MAINTENANCE OF TRAFFIC

Amend this Section by adding the following new subsection:

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

Category 1 (Cones, Drums, Tubular Markers, Flexible Delineators, and similar devices that have little chance if causing windshield penetration, tire damage, or other significant effect on the control or trajectory of a vehicle) – All Category 1 devices will be manufacturer self-certified as MASH2016 by January 1, 2025. Current Category 1 devices in useful serviceable condition that are not self-certified as MASH2016 compliant may be utilized through December 31, 2024.

Category 2 (Barricades, Portable Sign Supports, Category 1 devices with attachments, and similar devices that are not expected to produce significant vehicular velocity change but may be otherwise hazardous) – All Category 2 devices will be crash tested and/or evaluated to MASH2016 criteria by January 1, 2025. Current Category 2 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2024.

Category 3 (Portable Concrete Barrier, Portable Crash Cushions, Truck Mounted Attenuators, Category 2 devices weighing more than 100 pounds, and similar devices that are expected to produce significant vehicular velocity change or other harmful reactions) – All Category 3 devices will be crash tested and/or evaluated to MASH2016 criteria by January 1, 2030. Current Category 3 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2029. (See Standard Specification 526 for additional Portable Concrete Barrier information).

Category 4 (Trailer Mounted Devices: Arrow Boards, Temporary Traffic Control Signals, Area Lighting, Portable Changeable Message Sign, and other similar devices.) – All Category 4 devices will be crash tested and/or evaluated to MASH2016 criteria by January 1,

2030. Current Category 4 devices in useful serviceable condition that are successfully tested to NCHRP Report 350 or MASH2009 criteria may be utilized through December 31, 2029."

652.4 Flaggers Revise the first paragraph of this section so that it reads:

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

SECTION 681
PRECAST AGGREGATE-FILLED, CONCRETE BLOCK GRAVITY WALL

681.08 Basis of Payment Amend this section by adding the Item Number "**681.10**' in front of the item "Precast Aggregate-Filled Concrete Block Gravity Wall" at the end of the section.

SECTION 703
AGGREGATES

Add the following to Section 703 - Aggregates

703.01 Fine Aggregate for Concrete Fine aggregate for concrete shall consist of natural sand or, when approved by the Resident, other inert materials with similar characteristics or combinations thereof, having strong, durable particles. Fine aggregate from different sources of supply shall not be mixed or stored in the same pile nor used alternately in the same class of construction or mix without permission of the Resident.

All fine aggregate shall be free from injurious amounts of organic impurities. Should the fine aggregate, when subjected to the colorimetric test for organic impurities, AASHTO T 21, produce a color darker than the reference standard color solution (laboratory designation Plate III), the fine aggregate shall be rejected.

Fine aggregate shall have a sand equivalent value of not less than 75 when tested in accordance with AASHTO T 176.
Fine aggregate sources shall meet the Alkali Silica Reactivity (ASR) requirements of Section 703.0201.

The fineness modulus shall not be less than 2.26 or more than 3.14. If this value is exceeded, the fine aggregate will be rejected unless suitable adjustments are made in proportions of coarse and fine aggregate. The fineness modulus of fine aggregate shall be determined by adding the cumulative percentages of material by weight retained on the following sieves: Nos. 4, 8, 16, 30, 50, 100 and dividing by 100.

Fine aggregate, from an individual source when tested for absorption as specified in AASHTO T 84, shall show an absorption of not more than 2.3 percent.

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
⅜ inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10
No. 200	0-5.0

703.02 Coarse Aggregate for Concrete Coarse aggregate for concrete shall consist of crushed stone or gravel having hard, strong, durable pieces, free from adherent coatings and of which the composite blend retained on the ⅜ inch sieve shall contain no more than 15 percent, by weight of flat and elongated particles when performed in accordance with test method ASTM D 4791, Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate, using a dimensional ratio of 1:5.

The coarse aggregate from an individual source shall have an absorption no greater than 2.0 percent by weight determined in accordance with AASHTO T 85 modified for weight of sample.

The composite blend shall have a Micro-Deval value of 18.0 percent or less as determined by AASHTO T 327 or not exceed 40 percent loss as determined by AASHTO T 96.

Coarse aggregate sources shall meet the Alkali Silica Reactivity (ASR) requirements of Section 703.0201.

Coarse aggregate shall conform to the requirements of the following table for the size or sizes designated and shall be well graded between the limits specified.

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves			
Grading	A	AA	S	LATEX
Aggregate Size	1 inch	¾ inch	1½ inch	½ inch
2 inch			100	
1½ inch	100		95-100	
1 inch	95-100	100	-	
¾ inch	-	90-100	35-70	100
½ inch	25-60	-	-	90-100
⅜ inch	-	20-55	10-30	40-70
No. 4	0-10	0-10	0-5	0-15
No. 8	0-5	0-5	-	0-5
No. 16	-	-	-	-
No. 50	-	-	-	-
No. 200	0 - 1.5	0 - 1.5	0 - 1.5	0 - 1.5

703.0201 Alkali Silica Reactive Aggregates All coarse and fine aggregates proposed for use in concrete shall be tested for Alkali Silica Reactivity (ASR) potential under AASHTO T 303 (ASTM C 1260), Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction, prior to being accepted for use. Acceptance will be based on testing performed by an accredited independent lab submitted to the Department. Aggregate submittals will be required on a 5-year cycle, unless the source or character of the aggregate in question has changed within 5 years from the last test date.

As per AASHTO T 303 (ASTM C 1260): Use of a particular coarse or fine aggregate will be allowed with no restrictions when the mortar bars made with this aggregate expand less than or equal to 0.10 percent at 30 days from casting. Use of a particular coarse or fine aggregate will be classified as potentially reactive when the mortar bars made with this aggregate expand greater than 0.10 percent at 30 days from casting. Use of this aggregate will only be allowed with the use of cement-pozzolan blends and/or chemical admixtures that result in mortar bar expansion of less than 0.10 percent at 30 days from casting as tested under ASTM C 1567.

Acceptable pozzolans and chemical admixtures that may be used when an aggregate is classified as potentially reactive include, but are not limited to the following:

a. Class F Coal Fly Ash meeting the requirements of AASHTO M 295
b. Ground Granulated Blast Furnace Slag (Grade 100 or 120) meeting the requirements of AASHTO M 302
c. Densified Silica Fume meeting the requirements of AASHTO M 307
d. Lithium-based admixtures
e. Metakaolin

Pozzolans or chemical admixtures required to offset the effects of potentially reactive aggregates will be incorporated into the concrete at no additional cost to the Department.

703.05 Aggregate for Sand Leveling Aggregate for sand leveling shall be sand of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The aggregate shall meet the grading requirements of the following table.

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
⅜ inch	85-100
No. 200	0-5.0

703.06 Aggregate for Base and Subbase The following shall apply to Sections (a.) and (c.) below. The material shall have a Micro-Deval value of 25.0 or less as determined by AASHTO T 327. If the Micro- Deval value exceeds 25.0, the Washington State Degradation DOT Test Method T113, Method of Test for Determination of Degradation Value (January 2009 version) shall be performed, except that the test shall be performed on the portion of the sample that passes the ½ in sieve and is retained on the No. 10 sieve. If the material has a Washington Degradation value of less than 15, the material shall be rejected.
The material used in Section (b.) below shall have a Micro-Deval value of 25.0 or less as determined by AASHTO T 327. If the Micro-Deval value exceeds 25.0 the material may be used if it does not exceed 25 percent loss on AASHTO T 96, Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

Recycled Asphalt Pavement (RAP) shall not be used for or blended with aggregate base or subbase.

a. Aggregate for base, Type A and B shall be crushed ledge or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3 inch sieve shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Type A	Type B
½ inch	45-70	35-75
¼ inch	30-55	25-60
No. 40	0-20	0-25
No. 200	0-6.0	0-6.0

At least 50 percent by weight of the material retained on the No. 4 sieve shall have at least one fractured face as tested by AASHTO T 335.

Type A aggregate for base shall only contain particles of rock that will pass the 2 inch square mesh sieve.

Type B aggregate for base shall only contain particles of rock that will pass the 4 inch square mesh sieve.

b. Aggregate for base, Type C shall be crushed ledge or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The material shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
	Type C
4 inches	100
3 inches	90-100
2 inches	75-100
1 inch	50-80
½ inch	30-60
No. 4	15-40
No. 200	0-6.0

At least 50 percent by weight of the material coarser than the No. 4 sieve shall have at least one fractured face as tested by AASHTO T 335.

c. Aggregate for subbase shall be sand or gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3 inch sieve shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Type D	Type E
½ in	35-80	
¼ inch	25-65	25-100
No. 40	0-30	0-50
No. 200	0-7.0	0-7.0

Type D aggregate for subbase gravel may contain up to 50 percent by weight Recycled Concrete Aggregate (RCA). When RCA is used, the portion of the resulting blend of gravel and RCA retained on a ½" square mesh sieve shall contain a total of no more than 5 percent by weight of other recycled materials such as brick, concrete masonry block, or asphalt pavement as determined by visual inspection.

RCA shall be substantially free of wood, metal, plaster, and gypsum board as defined in Note 9 in Section 7.4 of AASHTO M 319. RCA shall also be free of all substances that fall under the category of solid waste or hazardous materials.

Aggregate for subbase shall not contain particles of rock which will not pass the 6 inch square mesh sieve.

703.08 Recycled Asphalt Pavement Recycled asphalt pavement shall consist of salvaged asphalt materials from milled pavements or production waste that has been processed before use to meet the requirements of the job mix formula. It shall be free of winter sand, granular fill, construction debris, or other materials not generally considered asphalt pavement.

703.081 RAP for Asphalt Pavement Recycled Asphalt Pavement (RAP) may be introduced into hot-mix asphalt pavement at percentages approved by the Department according to the MaineDOT Policies and Procedures for HMA Sampling and Testing.

If approved by the Department, the Contractor shall provide documentation stating the source, test results for average residual asphalt content, and stockpile gradations showing RAP materials have been sized to meet the maximum aggregate size requirements of each mix designation. The Department will obtain samples for verification and approval prior to its use.

The maximum allowable percent of RAP shall be determined by the asphalt content, the percent passing the 0.075 mm sieve, the ratio between the percent passing the 0.075 mm sieve and the asphalt content, and Coarse Micro-Deval loss values as tested by the Department.

The maximum percentage of RAP allowable shall be the lowest percentage as determined according to Table 4 below:

Classification	Maximum RAP Percentage Allowed	Asphalt content standard deviation	Percent passing 0.075 mm sieve standard deviation	Percent passing 0.075 mm sieve / asphalt content ratio	Residual aggregate M-D loss value
Class III	**10%**	**≤ 1.0**	**N/A**	**≤ 4.0**	**≤ 18**
Class II	**20%**	**≤ 0.5**	**≤ 1.0**	**≤ 2.8**	
Class I	**30%**	**≤ 0.3**	**≤ 0.5**	**≤ 1.8**	

Table 4: Maximum Percent RAP According to Test Results

The Department will monitor RAP asphalt content and gradation during production by testing samples from the stockpile at approximately 15,000 T intervals (in terms of mix production). The allowable variance limits (from the numerical average values used for mix designs) for this testing are determined based upon the maximum allowable RAP percentage and are shown below in Table 5.

Table 5: RAP Verification Limits

Classification	Asphalt content (compared to aim)	Percent passing 0.075 mm sieve (compared to aim)
Class III	± 1.5	± 2.0
Class II	± 1.0	± 1.5
Class I	± 0.5	± 0.7

For specification purposes, RAP will be categorized as follows:

Class III – A maximum of 10.0 percent of Class III RAP may be used in any base, intermediate base, surface, or shim mixture. A maximum of 20.0 percent of Class III RAP may be used in hand-placed mixes for item 403.209.

Class II – A maximum of 20.0 percent Class II RAP in any base, binder, surface, or shim course.

Class I – A maximum of 20.0 percent Class I RAP may be used in any base, intermediate base, surface, or shim mixture without requiring a change to the specified asphalt binder. A maximum of 30.0 percent Class I RAP may be used in in any base or intermediate base mixture provided that a PG 58-28 or PG 58-34 asphalt binder is used. A maximum of 30.0 percent Class I RAP may be used in any surface or shim mixture provided that PG 58-34 asphalt binder is used. Mixtures exceeding 20.0 percent Class I RAP must be evaluated and approved by the Department.

The Contractor may use up to two different RAP sources in any one mix design. The total RAP percentage of the mix shall not exceed the maximum allowed for the highest classification RAP source used (i.e. if a Class I & Class III used, total RAP must not exceed 30.0%). The blended RAP material must meet all the requirements of the classification for which the RAP is entered (i.e. 10% Class III with 20% Class I, blend must meet Class I criteria). The Department may take belt cuts of the blended RAP to verify the material meets these requirements. If the Contractor elects to use more than one RAP source in a design, the Contractor shall provide an acceptable point of sampling blended RAP material from the feed belt.

In the event that RAP source or properties change, the Contractor shall notify the Department of the change and submit new documentation stating the new source or properties a minimum of 72 hours prior to the change to allow for obtaining new samples and approval.

SECTION 710
FENCE AND GUARDRAIL

710.06 Fence Posts and Braces Revise the first Paragraph so that it reads:

"Wood posts shall be of cedar, white oak, or tamarack or other AWPA approved species, of the diameter or section and length shown on the plans."

Remove the fourth paragraph which starts " That portion of wood posts…".

Revise the paragraph beginning with "Braces shall be of spruce, eastern hemlock … so that it now reads:

"Braces shall be of spruce, eastern hemlock, Norway pine, pitch pine, or tamarack timbers or other AWPA approved species, or spruce, cedar, tamarack or other AWPA approved species round posts of sufficient length to make a diagonal brace between adjacent posts. All wood posts and braces shall be pressure-treated in accordance with AASHTO M 133 and AWPA U1, UC4A Commodity Specification B: Posts. "

710.07 Guardrail Posts Revise this section so that the first sentence of section a. reads:

"a. Wood posts shall be of Norway pine, southern yellow pine, pitch pine, Douglas fir, red pine, white pine, or eastern hemlock or other AWPA approved species."

Revise the next paragraph so that it reads:

Wood posts and offset brackets shall be preservative treated in accordance with the requirements of AASHTO M 133 and AWPA U1, UC4A Commodity Specification B: Posts.

SECTION 712
MISCELLANEOUS HIGHWAY MATERIAL

712.061 Structural Precast Units Amend this section by adding the following sentence to the end of the first paragraph of the Construction subsection:

"Facilities certified by NPCA or PCI shall provide to the Fabrication Engineer a copy of their annual audit to include deficiency reports and corrective actions."

Revise this section by changing the letter "b" of ASTM C1611 of the Concrete Testing subsection so that it reads:

"**b. Air content shall be 5.0% to 8.0%**."

SECTION 718
TRAFFIC SIGNALS MATERIAL

718.03 Signal Mounting Amend the paragraph beginning with "All trunions, brackets and…" by adding "**For polycarbonate signal heads with more than 3 sections or requiring mounting extensions greater than 12 inches in length, reinforcing plates shall be used to reinforce the housings at the point of attachment.**" to the end of the paragraph.

718.08 Controller Cabinet Revise this subsection by replacing the paragraph beginning with "The cabinet shall be supplied with LED light panels…" on or about page 7-66 with "**The cabinet shall be supplied with white LED light panels which shall automatically illuminate via a door open switch whenever one of the four main cabinet doors are opened for the ground mount cabinet or two main doors for the side of pole cabinet. The ground mounted cabinet shall contain four LED light panels per side totaling eight panels for the cabinet; one panel each at the top and bottom portion of the front side and back side on the Control side and Power/Auxiliary side of the cabinet. Each light panel shall produce a minimum of 250 lumens for a total minimum lumen output of 2000 lumens with all eight panels illuminated. The minimum output per side would be 1000 lumens. The LED panels shall be protected by a clear shatterproof shield. The side of pole mounted cabinet shall contain four light panels; one at the top of the rack assembly and one at the bottom rack assembly on each side of the cabinet. A second door open status switch per door shall activate a controller input to log a report event that one of the doors was opened. All door open status switches shall be connected to the same controller input. For the ground mount cabinet, there shall be two switches on each of the four main doors. For the side-of-pole mount cabinet, there shall be two switches on each of the two main doors**."

Revise this subsection by replacing the paragraph beginning with "The cabinet shall be supplied with a generator panel …" on or about page 7-68 with:

"The cabinet shall be supplied with a generator panel. The generator panel shall consist of a manual transfer switch and a twist-lock connector for generator hookup. The transfer switch knob and twist-lock connector shall be located inside a stainless steel enclosure with a separate lockable door accessed with a Corbin #2 key. The unit shall be mounted on the left, exterior of the control side wall of the ground mount cabinet a minimum of 36" above the surrounding grade and on the lower left side of the pole mounted cabinet. The generator transfer switch shall be a Reliance C30A1N Signa Series or approved equal. "

Revise this subsection by removing the following from the paragraph beginning with "The ground mounted cabinet shall be supplied and installed with an electric service meter socket trim and electrical service disconnect switch …" on or about page 7-69: **"(removed: thus preventing that space from being used either by equipment supplied as part of the project, or future equipment that would be installed in the rack system. Joe indicated that he would add this language to the detail so it is covered.)".**

Revise this subsection by replacing the following in the paragraph beginning with "The Contractor shall reconfigure the default user name…" on or around page 7-70; "MaineDOT IT" with "**MaineDOT Traffic Division**".

In the paragraph beginning with "Tests shall be conducted by the contractor…" on or around page 7-73, amend this subsection by removing **"in the state of Maine and"** after "The facility shall be".

Amend this Section by adding the following subsection:

718.13 Field Monitoring Unit (FMU) This item of work shall conform to this specification. This item shall consist of furnishing and installing a Field Monitoring Unit (FMU) and software, as well as all needed accessories required for a full and complete installation, including but not limited to power adapters, Ethernet cables, and interface cables, as described herein.

Where applicable, communications from MaineDOT's cloud-based Central Management System (CMS) to the on-street traffic signal controllers shall be made through fiber optic interconnect cable connected back to existing internet connections and/or the Field Monitoring Unit (FMU). The Contractor shall furnish and install all materials necessary for a complete and operational fiber optic interconnection to all project intersections as shown on the plans. All connections to the CMS cloud-based system shall be via a secure VPN network.

The FMU shall be the only remote connection device used by isolated intersections to connect to the cloud-based system. All connections shall be encrypted VPN tunnels. The Contractor shall coordinate all configuration settings with MaineDOT IT and the Engineer.

The FMU central web based interface shall be a separate element from the CMS.

MATERIALS: The materials for this work shall conform to the following requirements:

1. The work under this item specifies the requirements for the FMU. The FMU shall operate independent of the brand/type of intersection controller deployed in the ATC traffic cabinet.

2. The FMU shall conform to the following requirements:
    - 2.1 The FMU shall function correctly between -34 degrees C and +74 degrees C.
    - 2.2 The FMU shall be provided with appropriately rated connectors that allows the FMU to be exchanged by unplugging connectors, without tools.
    - 2.3 The FMU shall monitor and log all ATC Controller and ATC cabinet faults and or alarms.
    - 2.4 The FMU shall be wired directly to the ATC cabinet.
    - 2.5 The FMU shall have an internal cellular modem running at 4G LTE.
        - 2.5.1 The Cellular modem shall be designed to be replaced / upgraded to 5G service when available.
    - 2.6 The FMU shall incorporate an integrated GPS and cell modem.
    - 2.7 The configuration of the FMU shall be accomplished by accessing the internal web server with a browser. It shall be possible to configure the FMU without any special software.

2.8 The FMU shall be powered via a standard 120V input power.

2.9 The FMU shall allow for the routing of the controller configuration packets to and from the controller (either by Ethernet or serial communications) for any type of controller utilized by the MaineDOT. In this way it shall be possible to configure the controller and utilize the controller specific software to interrogate the controller, and the FMU shall provide the communications pipe which allows this to be accomplished.

2.10 The FMU shall, within the size limitations above, include a battery and battery charging/monitoring circuit, to allow the FMU to function correctly even when all power to the intersection has failed. The battery shall continue to power the FMU for a minimum of 5 hours after all power has failed to the intersection.

2.11 The FMU shall incorporate an integrated GPS which will allow the FMU to geo-locate itself on the FMU management software map, without configuration.

2.12 The FMU shall operate without requiring a static IP address. The only configuration required at the FMU is to enter the URL of where the FMU management software is hosted.

2.13 In the event that the cell service is interrupted or is not available, the FMU shall store any events that occur in internal memory and forward these events automatically to the FMU management software when the cell service is restored. In this way, a complete record of events at the device can be maintained even if cell service is interrupted for a period. The system will store 5000 events.

2.14 The FMU shall utilize HTTP and HTTPS protocols, and XML data structures, for communication with the FMU management software. In this way the data will be open for future expansion and competition. The use of secret proprietary protocols is not permitted.

2.15 The FMU shall include Ethernet communications via an Ethernet Port with RJ45 connector.

2.16 The FMU shall include weather proof antennas.

3. **Map Display FMU Management Software**

3.1 The FMU shall include a scrollable, zoomable map display, with the intersections and other monitored devices shown as representative icons on the map. The map shall include the ability to see the intersections using Google Streetview.

3.2 The alarm status of the intersection shall be clearly indicated on the icon on the map, so that the user can see at a glance which intersections are in alarm.

3.3 The map display shall also include a list of intersections, with the number and priority of alarms indicated on the list. Intersections in high priority alarm shall be moved to the top

of the list, followed by medium priority, low priority and then finally by intersections not in alarm.

3.4 The icons shall change to be able to clearly indicate if an intersection is offline.

3.5 Clicking on the icon on the map shall expose a box with the current parameters of the intersection shown.

3.6 The default map display position and zoom shall be configurable by user, so that the user's view will default to show the intersections that the user is responsible for managing.

3.7 The map view shall have the ability to show Google traffic overlays on the map.

4. **Intersection Detail Display FMU Management Software**

4.1 It shall be possible to drill down, either from the map icon or from the list, to a device level detail for the intersection, which as a minimum shall display the following parameters:

4.1.1 The alarm status, with priority indicated, and a text description of the alarm (if an alarm is present for this device).

4.1.2 The time since the last communication with the device

4.1.3 The following parameters (real time now values, minimum for the day values, maximum for the day values, and average for the day values)

4.1.3.1 The AC mains voltage (value)

4.1.3.2 The battery back-up voltage (value)

4.1.3.3 The cabinet temperature (value)

4.1.3.4 The cabinet humidity (value)

4.1.3.5 The presence of AC power (OK or Fail)

4.1.3.6 The flashing status of the intersection (OK or Flashing)

4.1.3.7 Stop Time status (OK or Stop Time Active)

4.1.3.8 The cabinet door status (Open or Closed)

4.1.3.9 The intersection fan status (Fan On or Fan off)

4.1.4 It shall be possible to view graphs of each of the value parameters in graphical form, over the recent two-week period. This includes real time graphs of:

4.1.4.1 The AC mains voltage

4.1.4.2 The battery back-up voltage

4.1.4.3 The cabinet temperature

4.1.4.4 The cabinet humidity

5. **Diagnostics and Log Display FMU Management Software**

5.1 From the device level detail within the FMU management software, it shall be possible to drill down to get the raw data; the error logs; and the communications logs to allow a technician to fault-find problems.

5.2 It shall be possible to filter the logs by Device; by Device Type and/or by Group as well as between dates.

5.3 It shall be possible to print these selected logs to a local printer or a PDF file.

5.4 It shall be possible to export these logs to Excel on the local computer for further analysis.

6. **Alarms FMU Management Software**

6.1 The FMU management software shall have a comprehensive alarm generation capability

6.2 It shall be possible to configure alarms to be generated on any parameter becoming out of tolerance, including analog values, digital values and enumerated values.

6.3 Alarms shall be configurable to be of Low, High or Critical Priority.

6.4 The alarm priority shall be displayed throughout the FMU management software, on all displays, using color codes such as red-critical; yellow – high; and amber-low to indicate the priority of the alarm.

6.5 The current active alarms shall be accessible for view via an expandable window, to see which alarms are active and when the alarm occurred. The highest priority alarms shall rise to the top of the list.

7. **Alerts FMU Management Software**

7.1 The FMU management software shall have comprehensive alerting capability, to enable the response personnel to be notified when an abnormal situation has occurred.

7.2 It shall be possible to configure alerts to one or more personnel for each alarm. This will cause, as selected, an SMS and/or an email to be sent to the person when an alarm occurs.

7.3 The alert shall be configurable to optionally send via email and/or via SMS a message when an alarm clears.

7.4 The intention is that the FMU management software provides the alerts to the user in near real time. The SMS and email shall be issued within 30 seconds of the occurrence of event which results in an alert being issued.

8. **Hosting and Connectivity and Service FMU / FMU Management Software**

8.1 The contractor shall supply the FMU with the FMU manufacturers 10 year options for Connectivity and Service, as part of the purchase price. The Connectivity and Service agreement shall include at a minimum:

8.1.1 Cellular Connectivity

8.1.2 No cellular overage charges

8.1.3 Extended warranty on the hardware for the period of the Connectivity and Service Agreement

8.1.4 Over-the-air software updates

8.1.5 Over-the-air security updates

8.1.6 Future Connected Vehicles Service

SECTION 720
STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS

720.12 Wood Sign Posts Revise the first sentence so that it reads:

Wood sign posts shall be rectangular, straight and sound timber, cut from live growing native spruce, red pine, hemlock, cedar trees or other AWPA approved species, free from loose knots or other structurally weakening defects of importance, such as shake or holes or heart rot.

Revise the third paragraph that starts with "When pressure treated…" so that it reads:

All sign posts shall be pressure-treated in accordance with AASHTO M 133 and AWPA Standard U1, UC4A, Commodity Specification A: Sawn Products.

APPENDIX A TO DIVISION 100

SECTION 1 - BIDDING PROVISIONS

A. Federally Required Certifications By signing and delivering a Bid, the Bidder certifies as provided in all certifications set forth in this Appendix A - Federal Contract Provisions Supplement including:

- Certification Regarding No Kickbacks to Procure Contract as provided on this page 1 below.
- Certification Regarding Non-collusion as provided on page 1 below.
- Certification Regarding Non-segregated Facilities as provided by FHWA Form 1273, section III set forth on page 21 below.
- "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion" as provided by FHWA Form 1273, section XI set forth on page 32 below.
- "Certification Regarding Use of Contract Funds for Lobbying" as provided by FHWA Form 1273, section XII set forth on page 35 below.

Unless otherwise provided below, the term "Bidder", for the purposes of these certifications, includes the Bidder, its principals, and the person(s) signing the Bid. Upon execution of the Contract, the Bidder (then called the Contractor) will again make all the certifications indicated in this paragraph above.

CERTIFICATION REGARDING NO KICKBACKS TO PROCURE CONTRACT Except expressly stated by the Bidder on sheets submitted with the Bid (if any), the Bidder hereby certifies, to the best of its knowledge and belief, that it has not:

(A) employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other then a bona fide employee working solely for me) to solicit or secure this contract;

(B) agreed, as an express or implied condition for obtaining this contract, to employ or retain the services of any firm or person in connection with carrying out the contract, or;

C) paid, or agreed to pay, to any firm, organization, or person (other than a bona fide employee working solely for me) any fee, contribution, donation, or consideration of any kind for, or in connection with, procuring or carrying out the contract;

By signing and submitting a Bid, the Bidder acknowledges that this certification is to be furnished to the Maine Department of Transportation and the Federal Highway Administration, U.S. Department of Transportation in connection with this contract in anticipation of federal aid highway funds and is subject to applicable state and federal laws, both criminal and civil.

CERTIFICATION REGARDING NONCOLLUSION Under penalty of perjury as provided by federal law (28 U.S.C. §1746), the Bidder hereby certifies, to the best of its knowledge and belief, that:

> the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with the Contract.

For a related provisions, see Section 102.7.2 (C) of the Standard Specifications - "Effects of Signing and Delivery of Bids" - "Certifications", Section 3 of this Appendix A entitled "Other Federal Requirements" including section XI - "Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion" and section XII. - "Certification Regarding Use of Contract Funds for Lobbying."

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B. Bid Rigging Hotline To report bid rigging activities call: **1-800-424-9071**

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

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SECTION 2 - FEDERAL EEO AND CIVIL RIGHTS REQUIREMENTS

Unless expressly otherwise provided in the Bid Documents, the provisions contained in this Section 2 of this "Federal Contract Provisions Supplement" are hereby incorporated into the Bid Documents and Contract.

A. Nondiscrimination & Civil Rights - Title VI The Contractor and its subcontractors shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the Department deems appropriate. The Contractor and subcontractors shall comply with Title VI of the Civil Rights Act of 1964, as amended, and with all State of Maine and other Federal Civil Rights laws.

For related provisions, see Subsection B - "Nondiscrimination and Affirmative Action - Executive Order 11246" of this Section 2 and Section 3 - Other Federal Requirements of this "Federal Contract Provisions Supplement" including section II - "Nondiscrimination" of the "Required Contract Provisions, Federal Aid Construction Contracts", FHWA-1273.

B. Nondiscrimination and Affirmative Action - Executive Order 11246 Pursuant to Executive Order 11246, which was issued by President Johnson in 1965 and amended in 1967 and 1978, this Contract provides as follows.

The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its efforts to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

Ensure and maintain a working environment free of harassment, intimidations, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all forepersons, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and to maintain a record of the organization's responses.

Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

Provide immediate written notification to the Department's Civil Rights Office when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Design-Builder's efforts to meet its obligations.

Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under B above.

Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligation; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Forepersons, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractor's and Subcontractors with whom the Contractor does or anticipates doing business.

Direct its recruitment efforts, both orally and written to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later that one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above describing the openings, screenings, procedures, and test to be used in the selection process.

Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth, both on the site and in other areas of a Contractor's workforce.

Validate all tests and other selection requirements.

Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

Ensure that all facilities and company activities are non segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contractor's and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

C. Goals for Employment of Women and Minorities Per Executive Order 11246, craft tradesperson goals are 6.9% women and .5% minorities employed. However, goals may be adjusted upward at the mutual agreement of the Contractor and the Department. Calculation of these percentages shall not include On-the-Job Training Program trainees, and shall not include clerical or field clerk position employees.

For a more complete presentation of requirements for such Goals, see the federally required document "Goals for Employment of Females and Minorities" set forth in the next 6 pages below.

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Start of GOALS FOR EMPLOYMENT OF FEMALES AND MINORITIES
Federally Required Contract Document

§60-4.2 Solicitations

(d) The following notice shall be included in, and shall be part of, all solicitations for offers and bids on all Federal and federally assisted construction contracts or subcontracts in excess of $10,000 to be performed in geographical areas designated by the Director pursuant to §60-4.6 of this part (see 41 CFR 60-4.2(a)):

Notice of Requirement for Affirmative Action to Ensure Equal Opportunity (Executive Order 11246)

1. The Offeror's or bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

Goals for female participation in each trade	6.9%

Goals for minority participation for each trade

Maine

001 Bangor, ME	0.8%
Non-SMSA Counties (Aroostook, Hancock, Penobscot, Piscataquis, Waldo, Washington)	
002 Portland-Lewiston, ME	
SMSA Counties: 4243 Lewiston-Auburn, ME (Androscoggin)	0.5%
6403 Portland, ME (Cumberland, Sagadahoc)	0.6%

Non-SMSA Counties: 0.5%
(Franklin, Kennebec, Knox, Lincoln, Oxford, Somerset, York)

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non federally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be in violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number of the subcontractor, estimated dollar amount of the subcontract; estimated started and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the Contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any).

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department form 941;

   d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of the North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the contractor, is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors for Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a. through p. of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical areas where the work is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specific.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant, thereto.

6. In order for the non working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as expensive as the following:

   a. Ensure and maintain a working environment free of harassment, intimidation, coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, when possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

   b. Establish and maintain a current list of minority and female recruitment sources provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

   c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment sources or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

   d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

   e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources complied under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment, efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing prior to the date for the acceptance of applications for apprenticeship or the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitation to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7 a through p.). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7 a through p. of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program and reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions take on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both make and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, specific minority group of women is underutilized.)

10. The Contractor shall not use the goals and timetables or affirmative action even through the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementation regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.6.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g. mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location sat which the work was performed. Records be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

End of GOALS FOR EMPLOYMENT OF FEMALES AND MINORITIES
Federally Required Contract Document

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D. Section '**D Disadvantaged Business Enterprise (DBE) Requirements**' is removed in its entirety. The DBE material is in:

Section 105.10 EQUAL OPPORTUNITY AND CIVIL RIGHTS.

SECTION 3 - OTHER FEDERAL REQUIREMENTS

Unless expressly otherwise provided in the Bid Documents, the provisions contained in this Section 3 of this "Federal Contract Provisions Supplement" are hereby incorporated into the Bid Documents and Contract.

A. Buy America

If the cost of products purchased for permanent use in this project which are manufactured of steel, iron or the application of any coating to products of these materials exceeds 0.1 percent of the contract amount, or $2,500.00, whichever is greater, the products shall have been manufactured and the coating applied in the United States. The coating materials are not subject to this clause, only the application of the coating. In computing that amount, only the cost of the product and coating application cost will be included.

Ore, for the manufacture of steel or iron, may be from outside the United States; however, all other manufacturing processes of steel or iron must be in the United States to qualify as having been manufactured in the United States.

United States includes the 50 United States and any place subject to the jurisdiction thereof.

Products of steel include, but are not limited to, such products as structural steel, piles, guardrail, steel culverts, reinforcing steel, structural plate and steel supports for signs, luminaries and signals.

Products of iron include, but are not limited to, such products as cast iron grates.

Application of coatings include, but are not limited to, such applications as epoxy, galvanized and paint.

To assure compliance with this section, the Contractor shall submit a certification letter on its letterhead to the Department stating the following:

> "This is to certify that products made of steel, iron or the application of any coating to products of these materials whose costs are in excess of $2,500.00 or 0.1 percent of the original contract amount, whichever is greater, were manufactured and the coating, if one was required, was applied in the United States."

B. Materials

a. Convict Produced Materials References: 23 U.S.C. 114(b)(2), 23 CFR 635.417
Applicability: FHWA's prohibition against the use of convict material only applies to Federal-aid highways. Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if: 1) such materials have been produced by convicts who are on parole, supervised release, or probation from a prison; or
2) such material has been produced in a qualified prison facility, e.g., prison industry, with the amount produced during any 12-month period, for use in Federal-aid projects, not exceeding the amount produced, for such use, during the 12-month period ending July 1, 1987.

Materials obtained from prison facilities (e.g., prison industries) are subject to the same requirements for Federal-aid participation that are imposed upon materials acquired from other sources. Materials manufactured or produced by convict labor will be given no preferential treatment.

The preferred method of obtaining materials for a project is through normal contracting procedures which require the contractor to furnish all materials to be incorporated in the work. The contractor selects the source, public or private, from which the materials are to be obtained (23 CFR 635.407). Prison industries are prohibited from bidding on projects directly (23 CFR 635.112e), but may act as material supplier to construction contractors.

Prison materials may also be approved as State-furnished material. However, since public agencies may not bid in competition with private firms, direct acquisition of materials from a

prison industry for use as State-furnished material is subject to a public interest finding with the Division Administrator's concurrence (23 CFR 635.407d). Selection of materials produced by convict labor as State-furnished materials for mandatory use should be cleared prior to the submittal of the Plans Specifications & Estimates (PS&E).

b. Patented/Proprietary Products References: 23 U.S.C. 112, 23 CFR 635.411

FHWA will not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

- the item is purchased or obtained through competitive bidding with equally suitable unpatented items,
- the STA certifies either that the proprietary or patented item is essential for synchronization with the existing highway facilities or that no equally suitable alternative exists, or
- the item is used for research or for a special type of construction on relatively short sections of road for experimental purposes. States should follow FHWA's procedures for "Construction Projects Incorporating Experimental Features" (expermnt.htm) for the submittal of work plans and evaluations.

The primary purpose of the policy is to have competition in selection of materials and allow for development of new materials and products. The policy further permits materials and products that are judged equal may be bid under generic specifications. If only patented or proprietary products are acceptable, they shall be bid as alternatives with all, or at least a reasonable number of, acceptable materials or products listed; and the Division Administrator may approve a single source if it can be found that its utilization is in the public interest.

Trade names are generally the key to identifying patented or proprietary materials. Trade name examples include 3M, Corten, etc. Generally, products identified by their brand or trade name are not to be specified without an "or equal" phrase, and, if trade names are used, all, or at least a reasonable number of acceptable "equal" materials or products should be listed. The licensing of several suppliers to produce a product does not change the fact that it is a single product and should not be specified to the exclusion of other equally suitable products.

c. State Preference References: 23 U.S.C. 112, 23 CFR 635.409

Materials produced within Maine shall not be favored to the exclusion of comparable materials produced outside of Maine. State preference clauses give particular advantage to the designated source and thus restrict competition. Therefore, State preference provisions shall not be used on any Federal-aid construction projects.

This policy also applies to State preference actions against materials of foreign origin, except as otherwise permitted by Federal law. Thus, States cannot give preference to in-State material sources over foreign material sources. Under the Buy America provisions, the States are

permitted to expand the Buy America restrictions provided that the STA is legally authorized under State law to impose more stringent requirements.

d. State Owned/Furnished/Designated Materials References: 23 U.S.C. 112, 23 CFR 635.407

Current FHWA policy requires that the contractor must furnish all materials to be incorporated in the work, and the contractor shall be permitted to select the sources from which the materials are to be obtained. Exceptions to this requirement may be made when there is a definite finding, by MaineDOT and concurred in by Federal Highway Administration's (FHWA) Division Administrator, that it is in the public interest to require the contractor to use materials furnished by the MaineDOT or from sources designated by MaineDOT. The exception policy can best be understood by separating State-furnished materials into the categories of manufactured materials and local natural materials.

Manufactured Materials When the use of State-furnished manufactured materials is approved based on a public interest finding, such use must be made mandatory. The optional use of State-furnished manufactured materials is in violation of our policy prohibiting public agencies from competing with private firms. Manufactured materials to be furnished by MaineDOT must be acquired through competitive bidding, unless there is a public interest finding for another method, and concurred in by FHWA's Division Administrator.

Local Natural Materials When MaineDOT owns or controls a local natural materials source such as a borrow pit or a stockpile of salvaged pavement material, etc., the materials may be designated for either optional or mandatory use; however, mandatory use will require a public interest finding (PIF) and FHWA's Division Administrator's concurrence.

In order to permit prospective bidders to properly prepare their bids, the location, cost, and any conditions to be met for obtaining materials that are made available to the contractor shall be stated in the bidding documents.

Mandatory Disposal Sites Normally, the disposal site for surplus excavated materials is to be of the contractor's choosing; although, an optional site(s) may be shown in the contract provisions. A mandatory site shall be specified when there is a finding by MaineDOT, with the concurrence of the Division Administrator, that such placement is the most economical or that the environment would be substantially enhanced without excessive cost. Discussion of the mandatory use of a disposal site in the environmental document may serve as the basis for the public interest finding.

Summarizing FHWA policy for the mandatory use of borrow or disposal sites:

- mandatory use of either requires a public interest finding and FHWA's Division Administrator's concurrence,
- mandatory use of either may be based on environmental consideration where the environment will be substantially enhanced without excessive additional cost, and
- where the use is based on environmental considerations, the discussion in the environmental document may be used as the basis for the public interest finding.

Factors to justify a public interest finding should include such items as cost effectiveness, system integrity, and local shortages of material.

C. Standard FHWA Contract Provisions - FHWA 1273

Unless expressly otherwise provided in the Bid Documents, the following "Required Contract Provisions, Federal Aid Construction Contracts", FHWA-1273, are hereby incorporated into the Bid Documents and Contract.

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Cargo Preference Act : Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor agrees—"(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels."(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590."(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."(Reorganization Plans No. 21 of 1950 (64 Stat. 1273) and No. 7 of 1961 (75 Stat. 840) as amended by Pub. L. 91-469 (84 Stat. 1036) and Department of Commerce Organization Order 10-8 (38 FR 19707, July 23, 1973)) [42 FR 57126, Nov. 1, 1977]

The Cargo Preference Act requirements apply to materials or equipment that are acquired for a specific Federal-aid highway project. In general, the requirements are not applicable to goods or materials that come into inventories independent of an FHWA funded-contract. For example, the requirements would not apply to shipments of Portland cement, asphalt cement, or aggregates, as industry suppliers and contractors use these materials to replenish existing inventories. In general, most of the materials used for highway construction originate from existing inventories and are not acquired solely for a specific Federal-aid project. However, if materials or equipment are acquired solely for a Federal-aid project, then the Cargo Preference Act requirements apply."

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Start of FHWA 1273 REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS (As revised through May 1, 2012)

FHWA-1273 -- Revised May 1, 2012

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. General
II. Nondiscrimination
III. Nonsegregated Facilities
IV. Davis-Bacon and Related Act Provisions
V. Contract Work Hours and Safety Standards Act Provisions
VI. Subletting or Assigning the Contract
VII. Safety: Accident Prevention
VIII. False Statements Concerning Highway Projects
IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
X. Compliance with Governmentwide Suspension and Debarment Requirements
XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment,

termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability.

The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women.

Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even

though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act),

daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a

different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

End of FHWA 1273

The United States Department of Transportation (USDOT) Standard Title VI/Non-Discrimination Assurances

DOT Order No. 1050.2A

The ***Maine Department of Transportation*** (herein referred to as the "Recipient"), **HEREBY AGREES THAT**, as a condition to receiving any Federal financial assistance from the U.S. Department of Transportation (DOT), through the ***Federal Highway Administration (FHWA***), is subject to and will comply with the following:

Statutory/Regulatory Authorities

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);
- 49 C.F.R. Part 21 (entitled Non-discrimination In Federally-Assisted Programs Of The Department Of Transportation-Effectuation Of Title VI Of The Civil Rights Act Of 1964);
- 28 C.F.R. Section 50.3 (U.S. Department of Justice Guidelines for Enforcement of Title VI of the Civil Rights Act of 1964);

The preceding statutory and regulatory cites hereinafter are referred to as the "Acts" and "Regulations," respectively.

General Assurances

In accordance with the Acts, the Regulations, and other pertinent directives, circulars, policy, memoranda, and/or guidance, the Recipient hereby gives assurance that it will promptly take any measures necessary to ensure that:

> *"No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity, "for which the Recipient receives Federal financial assistance from DOT, including the* ***FHWA****.*

The Civil Rights Restoration Act of 1987 clarified the original intent of Congress, with respect to Title VI and other Non-discrimination requirements (The Age Discrimination Act of 1975, and Section 504 of the Rehabilitation Act of 1973), by restoring the broad, institutional-wide scope and coverage of these non-discrimination statutes and requirements to include all programs and activities of the Recipient, so long as any portion of the program is Federally assisted.

Specific Assurances

More specifically, and without limiting the above general Assurance, the Recipient agrees with and gives the following Assurances with respect to its Federally assisted ***Highway Program***:

1. The Recipient agrees that each "activity," "facility," or "program," as defined in §§ 21.23(b) and 21.23(e) of 49 C.F.R. § 21 will be (with regard to an "activity") facilitated, or will be (with regard

E

to a "facility") operated, or will be (with regard to a "program") conducted in compliance with all requirements imposed by, or pursuant to the Acts and the Regulations.

2. The Recipient will insert the following notification in all solicitations for bids, Requests For Proposals for work, or material subject to the Acts and the Regulations made in connection with all ***Federal-Aid Highway Program activities*** and, in adapted form, in all proposals for negotiated agreements regardless of funding source:

> "The ***Maine Department of Transportation***, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award."

3. The Recipient will insert the clauses of Appendix A and E of this Assurance in every contract or agreement subject to the Acts and the Regulations.

4. The Recipient will insert the clauses of Appendix B of this Assurance, as a covenant running with the land, in any deed from the United States effecting or recording a transfer of real property, structures, use, or improvements thereon or interest therein to a Recipient.

5. That where the Recipient receives Federal financial assistance to construct a facility, or part of a facility, the Assurance will extend to the entire facility and facilities operated in connection therewith.

6. That where the Recipient receives Federal financial assistance in the form, or for the acquisition of real property or an interest in real property, the Assurance will extend to rights to space on, over, or under such property.

7. That the Recipient will include the clauses set forth in Appendix C and Appendix D of this Assurance, as a covenant running with the land, in any future deeds, leases, licenses, permits, or similar instruments entered into by the Recipient with other parties:

   a. for the subsequent transfer of real property acquired or improved under the applicable activity, project, or program; and
   b. for the construction or use of, or access to, space on, over, or under real property acquired or improved under the applicable activity, project, or program.

8. That this Assurance obligates the Recipient for the period during which Federal financial assistance is extended to the program, except where the Federal financial assistance is to provide, or is in the form of, personal property, or real property, or interest therein, or structures or improvements thereon, in which case the Assurance obligates the Recipient, or any transferee for the longer of the following periods:

a. the period during which the property is used for a purpose for which the Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits; or
b. the period during which the Recipient retains ownership or possession of the property.

9. The Recipient will provide for such methods of administration for the program as are found by the Secretary of Transportation or the official to whom he/she delegates specific authority to give reasonable guarantee that it, other recipients, sub-recipients, sub-grantees, contractors, subcontractors, consultants, transferees, successors in interest, and other participants of Federal financial assistance under such program will comply with all requirements imposed or pursuant to the Acts, the Regulations, and this Assurance.

10. The Recipient agrees that the United States has a right to seek judicial enforcement with regard to any matter arising under the Acts, the Regulations, and this Assurance.

By signing this ASSURANCE, the ***Maine Department of Transportation*** also agrees to comply (and require any sub-recipients, sub-grantees, contractors, successors, transferees, and/or assignees to comply) with all applicable provisions governing the ***FHWA and USDOT*** access to records, accounts, documents, information, facilities, and staff. You also recognize that you must comply with any program or compliance reviews, and/or complaint investigations conducted by the ***FHWA and USDOT***. You must keep records, reports, and submit the material for review upon request to ***FHWA and USDOT***, or its designee in a timely, complete, and accurate way. Additionally, you must comply with all other reporting, data collection, and evaluation requirements, as prescribed by law or detailed in program guidance.

The ***Maine Department of Transportation*** gives this ASSURANCE in consideration of and for obtaining any Federal grants, loans, contracts, agreements, property, and/or discounts, or other Federal-aid and Federal financial assistance extended after the date hereof to the recipients by the U.S. Department of Transportation under the ***Federal Aid Highway Program***. This ASSURANCE is binding on [***insert State***], other recipients, sub-recipients, sub-grantees, contractors, subcontractors and their subcontractors', transferees, successors in interest, and any other participants in the ***Federal Aid Highway Program***. The person(s) signing below is authorized to sign this ASSURANCE on behalf of the Recipient.

MAINE DEPARTMENT OF TRANSPORTATION
(*Name of Recipient*)

by _____
Bruce A. Van Note, Commissioner

DATED 2/13/19

APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations**: The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, ***Federal Highway Administration (FWHA)***, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Non-discrimination**: The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment**: In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. **Information and Reports**: The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the ***FHWA*** to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the ***FHWA***, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance**: In the event of a contractor's noncompliance with the Non discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the ***FHWA*** may determine to be appropriate, including, but not limited to:

    a. withholding payments to the contractor under the contract until the contractor complies; and/or
    b. cancelling, terminating, or suspending a contract, in whole or in part.

6. **Incorporation of Provisions**: The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the ***FHWA*** may direct as a means of enforcing such provisions including sanctions for

noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

APPENDIX B

CLAUSES FOR DEEDS TRANSFERRING UNITED STATES PROPERTY

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4:

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the ***Maine Department of Transportation*** will accept title to the lands and maintain the project constructed thereon in accordance with ***23 U.S. Code § 107***, the Regulations for the Administration of ***the Federal Aid Highway Program***, and the policies and procedures prescribed by the ***FHWA*** of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the ***Maine Department of Transportation*** all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto ***Maine Department of Transportation*** and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the ***Maine Department of Transportation***, its successors and assigns.

The ***Maine Department of Transportation***, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the ***Maine Department of Transportation*** will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned non-discrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

APPENDIX C

CLAUSES FOR TRANSFER OF REAL PROPERTY ACQUIRED OR IMPROVED UNDER THE ACTIVITY, FACILITY, OR PROGRAM

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the ***Maine Department of Transportation*** pursuant to the provisions of Assurance 7(a):

A. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

   1. In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

B. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Non-discrimination covenants, ***Maine Department of Transportation*** will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued.*

C. With respect to a deed, in the event of breach of any of the above Non-discrimination covenants, the ***Maine Department of Transportation*** will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the ***Maine Department of Transportation*** and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

APPENDIX D

CLAUSES FOR CONSTRUCTION/USE/ACCESS TO REAL PROPERTY ACQUIRED UNDER THE ACTIVITY, FACILITY OR PROGRAM

The following clauses will be included in deeds, licenses, permits, or similar instruments/agreements entered into by the ***Maine Department of Transportation*** pursuant to the provisions of Assurance 7(b):

A. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.

B. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non discrimination covenants, the ***Maine Department of Transportation*** will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued.*

C. With respect to deeds, in the event of breach of any of the above Non-discrimination covenants, the ***Maine Department of Transportation*** will there upon revert to and vest in and become the absolute property of the ***Maine Department of Transportation*** and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

APPENDIX E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

Environmental Summary Sheet

WIN: 18915.00 **Date Submitted: 9/21/2021**
Town: Brewer, Holden, Eddington
CPD Team Leader: Danielle Tetreau
ENV Field Contact: Ryan Annis

NEPA Complete: Record of Decision (ROD) signed on 6/23/2016

☒ **Section 106**
Review Complete: SHPO Concurrence 10/28/2019
Section 106 Resources: none

☐ **Section 4(f) and 6(f)**

Section 4(f)	Section 6(f)
Review Complete - No use	Not Applicable - No takes

☐ **Maine Department of Inland Fisheries and Wildlife Essential Habitat**
Not Applicable **Timing Window:** Not Applicable

☒ **Section 7**
Species of Concern: northern long-eared bat: Informal Consultation - See SP 105 Clearing Restriction
Atlantic salmon CH: Formal Consultation - See SP 105 In Stream Work

☒ **Essential Fish Habitat**
Species of Concern: Atlantic salmon Adverse Effect, not substantial – See SP 105 In Stream Work

☐ **Maine Department of Conservation/Public Lands, Submerged Land Lease**
Not Applicable

☐ **Maine Land Use Regulation Commission**
Not Applicable

☒ **Maine Department of Environmental Protection**
Individual Permit – NRPA Permit #L-28978
**Applicable Standards and Permits are included with the contract*

☒ **Army Corps of Engineers: Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.**
Individual Permit - Corps Permit #NAE-2004-02472 ***PERMIT PENDING***
-Work Start Notification form to be completed by ENV Field Contact and submitted to ACOE with copy to Team Leader.
-Compliance Certification Form to be completed by ENV Field Contact and submitted to ACOE with copy to Team Leader.
**Applicable Standards and Permits are included with the contract*

☒ **Stormwater Review**
Complete – Project complies with Chapter 500 Stormwater MOA

☐ **Hazardous Material Review**
Review Complete – No areas of concern identified

☒ **Special Provisions Required**

Special Provision 105 – Clearing Restrictions	N/A☐	Applicable☒
Special Provision 105 – In-Stream Work Restrictions	N/A☐	Applicable☒
Special Provision 105 – Environmental Requirements	N/A☐	Applicable☒
Special Provision 203-Dredge Materials	N/A☐	Applicable☒
Special Provision 203 – Special Fill	N/A☐	Applicable☒
Standard Specification 656-Erosion Control Plan	N/A☐	Applicable☒
Special Provision 610 – Channel Rock	N/A☒	Applicable☐
General Note for Hazardous Waste	N/A☒	Applicable☐

**All permits and approvals based on plans/scope as of: 9/1/2020*

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

IN THE MATTER OF

MAINE DEPARTMENT OF TRANSPORTATION	) NATURAL RESOURCES PROTECTION ACT
Brewer, Holden, Eddington, Penobscot County	) FRESHWATER WETLAND IMPACT
I-395 EXTENSION	) SIGNIFICANT WILDLIFE HABITAT
L-28978-TH-A-N (approval)	) STREAM CROSSING
L-28978-VP-B-N (approval)	)
L-28978-IW-C-N (approval)	)
L-28978-L6-D-N (approval)	) WATER QUALITY CERTIFICATION
L-28978-2G-E-N (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S. §§ 480-A–480-JJ, Section 401 of the Clean Water Act (33 U.S.C. § 1341), and Chapters 310, 315, and 335 of Department rules, the Department of Environmental Protection has considered the application of MAINE DEPARTMENT OF TRANSPORTATION with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. Summary: The applicant proposes to construct a 6.1-mile two-lane road between I-395 and Route 9 in the City of Brewer, and the towns of Holden and Eddington. Proposed impacts to protected natural resources include 23.3 acres of direct impacts to forested, scrub shrub, and emergent wetlands, including 3.3 acres of impacts to wetlands of special significance. Also proposed are 13.8 acres of temporary impacts to freshwater wetlands. The applicant proposes six stream crossings with 0.5 acres of direct impact and 0.1 acre of temporary impact. Additional impacts include impacts to the upland Critical Terrestrial Habitat (CTH) of a significant vernal pool and impact to the upland buffer of an Inland Waterfowl and Wading bird Habitat (IWWH).

B. Current Use of the Site: The applicant has exercised eminent domain over 56 properties located in the development area.

2. EXISTING SCENIC, AESTHETIC, RECREATIONAL OR NAVIGATIONAL USES:

The Natural Resources Protection Act (NRPA), in 38 M.R.S. § 480-D(1), requires the applicant to demonstrate that the proposed project will not unreasonably interfere with existing scenic, aesthetic, recreational and navigational uses.

In accordance with Chapter 315, *Assessing and Mitigating Impacts to Scenic and Aesthetic Uses* (06-096 C.M.R. ch. 315, effective June 29, 2003), the applicant submitted a copy of the Department's Visual Evaluation Field Survey Checklist as Appendix A to the application along with a description of the property and the proposed project. The

applicant also submitted several photographs of the proposed project site and surroundings. The project area contains residences and businesses as well as undeveloped areas.

The proposed project is not located within one mile of any scenic resource visited by the general public, in part, for the use, observation, enjoyment and appreciation of its natural and cultural visual qualities. The segments of the streams within the project area are not navigable by boaters.

The Department determined that based on the nature of the proposed project and its location, there are no existing recreational or navigational uses of the resource that would be unreasonably impacted.

3. SOIL EROSION:

The NRPA, in 38 M.R.S. § 480-D(2), requires the applicant to demonstrate that the proposed project will not cause unreasonable erosion of soil or sediment nor unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

The applicant agrees to comply with the Basic Standards of Chapter 500 as required by a Memorandum of Agreement with the Department. Staff for the MaineDOT will complete daily inspections for compliance. All disturbed soil will be seeded or covered with riprap immediately after completion of the project.

The Department finds that the activity will not cause unreasonable erosion of soil or sediment nor unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

4. HABITAT CONSIDERATIONS:

The NRPA, in 38 M.R.S. § 480-D(3), requires the applicant to demonstrate that the proposed project will not unreasonably harm significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic or adjacent upland habitat, travel corridor, freshwater, estuarine or marine fisheries or other aquatic life.

The applicant proposes six stream crossings including on Felts Brook, an unnamed tributary of Felts Brook, Eaton Brook, an unnamed intermittent tributary of Eaton Brook, and an unnamed perennial tributary of Eaton Brook. In designing the stream crossings, the applicant incorporated fish and wildlife passage features to minimize impacts.

The applicant proposes to impact 1.9 acres of freshwater wetland located in an Inland Waterfowl and Wading bird Habitat (IWWH). Within the CTH of a significant vernal pool, the applicant proposes to impact 0.52 acres of upland and 0.003 acres of freshwater wetland.

The Maine Department of Inland Fisheries and Wildlife (MDIFW) reviewed the proposed project and stated the project will impact portions of an IWWH, as well as Wetlands of Special Significance and wetlands in general, and a vernal pool (non-significant). As with any major project, there will be impacts (e.g., general loss of habitat) and disruptions (e.g., to movement patterns) to the resident wildlife population.

For fisheries, there will be direct impacts to streams including 6 new crossings and associated stream realignments and other impacts. So long as full unfettered (1.2 bankfull width (BFW) Stream Smart crossings) fish passage is provided, and construction Best Management Practices are adhered to, minimal impacts to passage and stream connectivity are anticipated.

Based on MDIFW staff review of the proposed mitigation parcel (described in Finding 6 below), IWWH and general wildlife habitat, including wetlands, as well as reaches of streams that support coldwater fisheries habitat, will be preserved in perpetuity. Therefore, it is MDIFW's assessment that the impacts described above will be adequately mitigated for through the proposed mitigation parcel.

The Department finds that the activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic or adjacent upland habitat, travel corridor, freshwater, estuarine or marine fisheries or other aquatic life.

5. WATER QUALITY CONSIDERATIONS:

As discussed in Finding 3, the applicant proposes to use erosion and sediment control during construction to minimize impacts to water quality from siltation.

The Department does not anticipate that the proposed project will violate any state water quality law, including those governing the classification of the State's waters.

6. WETLANDS AND WATERBODIES PROTECTION RULES:

The applicant proposes to directly alter 23.3 acres of freshwater wetland, to temporarily impact 13.8 acres of freshwater wetland, and to construct six stream crossings with 0.5 acres of direct impact and 0.1 acre of temporary impact to construct the proposed road. Of the 43 wetlands impacted by the project, twelve are considered Wetlands of Special Significance (WOSS) due to significant wildlife habitat, location (within 25 feet of a river, stream, or brook), or incorporation of at least 20,000 sf of aquatic vegetation, emergent marsh vegetation, or open water. Of the wetland impact total, approximately 3.3 acres are impacts to WOSS.

The *Wetlands and Waterbodies Protection Rules*, 06-096 C.M.R. ch. 310 (last amended November 11, 2018), interpret and elaborate on the Natural Resources Protection Act (NRPA) criteria for obtaining a permit. The rules guide the Department in its determination of whether a project's impacts would be unreasonable. A proposed project

would generally be found to be unreasonable if it would cause a loss in wetland area, functions and values and there is a practicable alternative to the project that would be less damaging to the environment. Each application for a NRPA permit that involves a freshwater wetland alteration must provide an analysis of alternatives in order to demonstrate that a practicable alternative does not exist.

A. Avoidance. An applicant must submit an analysis of whether there is a practicable alternative to the project that would be less damaging to the environment and this analysis is considered by the Department in its assessment of the reasonableness of any impacts. Additionally, for activities proposed in, on, or over wetlands of special significance the activity must be among the types listed in Chapter 310, § 5(A) or a practicable alternative less damaging to the environment is considered to exist and the impact is unreasonable. Impacts to wetlands of special significance for crossings by road are among the activities specifically provided for in Chapter 310, § 5(A)(1)(b). The applicant also submitted an alternatives analysis for the proposed project. A study authorized in 1998 identified issues with the current road configuration due to poor road geometry and an increase in both commercial and passenger traffic in the area. Subsequently, an environmental assessment was completed in 2000, followed by an environmental impact assessment in 2005. The purpose of the proposed project is to improve safety and flow of traffic transiting from I-395 to Route 9. The 2005 environmental impact assessment identified five alternatives, all of which included impacts to protected natural resources. In order to meet the needs of the project, some impacts are unavoidable.

B. Minimal Alteration. In support of an application and to address the analysis of the reasonableness of any impacts of a proposed project, an applicant must demonstrate that the amount of freshwater wetland to be altered will be kept to the minimum amount necessary for meeting the overall purpose of the project. Since 2001, the applicant has considered 70 build alternatives. Of those, the 2005 study identified five potential routes. In 2015, the final environmental impact study identified the current configuration as the preferred route with the least amount of natural resource impacts. After the preferred route determination, the applicant adjusted alignments and slopes to further minimize impacts from 26 acres to the proposed 23.3 acres.

C. Compensation. In accordance with Chapter 310, § 5(C)(6)(a)(i) and (ii), compensation may be required to achieve the goal of no net loss of freshwater wetland functions and values. The primary functions and values of the impacted wetlands are wildlife habitat, floodflow alteration, sediment/toxicant retention, and nutrient removal/retention/transformation. To compensate for the lost functions and values, the applicant proposes to preserve a 1,620-acre parcel known as Wrentham Woods in the Town of Holden. The parcel contains 333.5 acres of wetland, including 80.9 acres of emergent wetland. The site also contains 12 significant vernal pools and an IWWH. The primary functions and values of the on-site wetlands for the preservation area are floodflow alteration, sediment/toxicant retention, nutrient removal/retention/ transformation, sediment/shoreline stabilization, and wildlife habitat.

The Department finds the preservation parcel exceeds the required 8:1 ratio for acreage, and the functions and values of the parcel are appropriate for no net loss from the impacted wetlands.

Within one year of the start of construction, the applicant must transfer the preservation parcel to the Maine Department of Inland Fisheries and Wildlife (MDIFW). In the event MDIFW does not accept the parcel, within one year of the start of construction the applicant must transfer the parcel to a land management trust, or place deed restrictions on the parcel, with prior Department approval.

The Department finds that the applicant has avoided and minimized freshwater wetland impacts to the greatest extent practicable, and that the proposed project represents the least environmentally damaging alternative that meets the overall purpose of the project provided that the applicant preserves the Wrentham Woods parcel as required above.

7. OTHER CONSIDERATIONS:

The Department finds, based on the design, proposed construction methods, and location, the proposed project will not inhibit the natural transfer of soil from the terrestrial to the marine environment, will not interfere with the natural flow of any surface or subsurface waters, and will not cause or increase flooding. The proposed project is not located in a coastal sand dune system, is not a crossing of an outstanding river segment, and does not involve dredge spoils disposal or the transport of dredge spoils by water.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S. §§ 480-A–480-JJ and Section 401 of the Clean Water Act (33 U.S.C. § 1341):

A. The proposed activity will not unreasonably interfere with existing scenic, aesthetic, recreational, or navigational uses.

B. The proposed activity will not cause unreasonable erosion of soil or sediment.

C. The proposed activity will not unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

D. The proposed activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic or adjacent upland habitat, travel corridor, freshwater, estuarine, or marine fisheries or other aquatic life provided that the applicant meets the requirements in Finding 6.

E. The proposed activity will not unreasonably interfere with the natural flow of any surface or subsurface waters.

F. The proposed activity will not violate any state water quality law including those governing the classifications of the State's waters.

G. The proposed activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties.

H. The proposed activity is not on or adjacent to a sand dune.

I. The proposed activity is not on an outstanding river segment as noted in 38 M.R.S. § 480-P.

THEREFORE, the Department APPROVES the above noted application of MAINE DEPARTMENT OF TRANSPORTATION to construct a 6.1-mile road as described in Finding 1, SUBJECT TO THE ATTACHED CONDITIONS, and all applicable standards and regulations:

1. Standard Conditions of Approval, a copy attached.

2. The applicant shall take all necessary measures to ensure that its activities or those of its agents do not result in measurable erosion of soil on the site during the construction of the project covered by this approval.

3. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

4. Within one year of the start of construction, the applicant shall transfer the preservation parcel to the Maine Department of Inland Fisheries and Wildlife (MDIFW). In the event MDIFW does not accept the parcel, within one year of the start of construction the applicant shall transfer the parcel to a land management trust, or place deed restrictions on the parcel, with prior Department approval.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED IN AUGUSTA, MAINE, THIS 23RD DAY OF JUNE, 2021.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____
For: Melanie Loyzim, Commissioner

FILED
June 24th, 2021
State of Maine
Board of Environmental Protection

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

ME/L28978ANBNCNDNEN/ATS#87209, 87271, 87272, 87273, 87274

Natural Resources Protection Act (NRPA)
Standard Conditions

THE FOLLOWING STANDARD CONDITIONS SHALL APPLY TO ALL PERMITS GRANTED UNDER THE NATURAL RESOURCES PROTECTION ACT, 38 M.R.S. §§ 480-A ET SEQ., UNLESS OTHERWISE SPECIFICALLY STATED IN THE PERMIT.

A. Approval of Variations From Plans. The granting of this permit is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from these plans, proposals, and supporting documents is subject to review and approval prior to implementation.

B. Compliance With All Applicable Laws. The applicant shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.

C. Erosion Control. The applicant shall take all necessary measures to ensure that his activities or those of his agents do not result in measurable erosion of soils on the site during the construction and operation of the project covered by this Approval.

D. Compliance With Conditions. Should the project be found, at any time, not to be in compliance with any of the Conditions of this Approval, or should the applicant construct or operate this development in any way other the specified in the Application or Supporting Documents, as modified by the Conditions of this Approval, then the terms of this Approval shall be considered to have been violated.

E. Time frame for approvals. If construction or operation of the activity is not begun within four years, this permit shall lapse and the applicant shall reapply to the Board for a new permit. The applicant may not begin construction or operation of the activity until a new permit is granted. Reapplications for permits may include information submitted in the initial application by reference. This approval, if construction is begun within the four-year time frame, is valid for seven years. If construction is not completed within the seven-year time frame, the applicant must reapply for, and receive, approval prior to continuing construction.

F. No Construction Equipment Below High Water. No construction equipment used in the undertaking of an approved activity is allowed below the mean high water line unless otherwise specified by this permit.

G. Permit Included In Contract Bids. A copy of this permit must be included in or attached to all contract bid specifications for the approved activity.

H. Permit Shown To Contractor. Work done by a contractor pursuant to this permit shall not begin before the contractor has been shown by the applicant a copy of this permit.

Revised September 2016

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION, AUGUSTA, MAINE 04333

Erosion Control for Homeowners

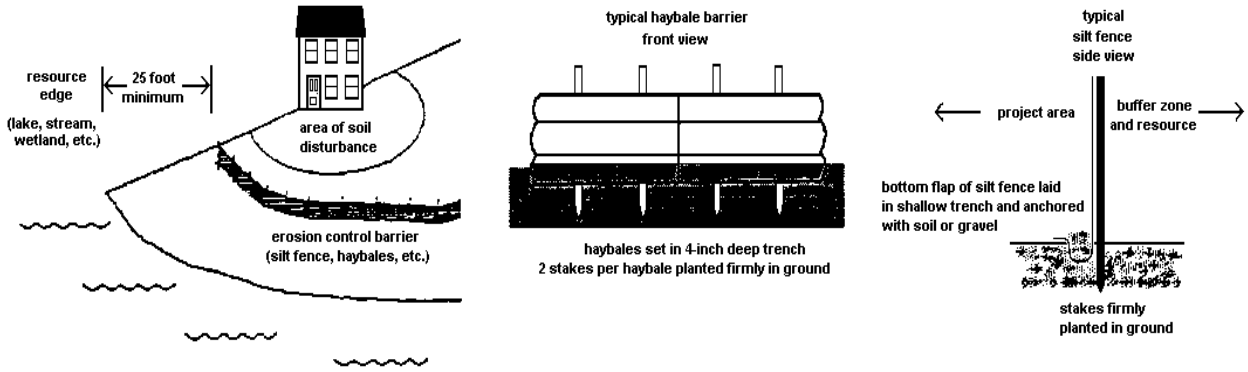
Before Construction

1. If you have hired a contractor, make sure you discuss your permit with them. Talk about what measures they plan to take to control erosion. Everybody involved should understand what the resource is, and where it is located. Most people can identify the edge of a lake or river. However, the edges of wetlands are often not so obvious. Your contractor may be the person actually pushing dirt around, but you are both responsible for complying with the permit.

2. Call around to find where erosion control materials are available. Chances are your contractor has these materials already on hand. You probably will need silt fence, hay bales, wooden stakes, grass seed (or conservation mix), and perhaps filter fabric. Places to check for these items include farm & feed supply stores, garden & lawn suppliers, and landscaping companies. It is not always easy to find hay or straw during late winter and early spring. It also may be more expensive during those times of year. Plan ahead – buy a supply early and keep it under a tarp.

3. Before any soil is disturbed, make sure an erosion control barrier has been installed. The barrier can be either a silt fence, a row of staked hay bales, or both. Use the drawings below as a guide for correct installation and placement. The barrier should be placed as close as possible to the soil-disturbance activity.

4. If a contractor is installing the erosion control barrier, double check it as a precaution. Erosion control barriers should be installed "on the contour", meaning at the same level or elevation across the land slope, whenever possible. This keeps stormwater from flowing to the lowest point along the barrier where it can build up and overflow or destroy the barrier.



During Construction

1. Use lots of hay or straw mulch on disturbed soil. The idea behind mulch is to prevent rain from striking the soil directly. It is the force of raindrops hitting the bare ground that makes the soil begin to move downslope with the runoff water, and cause erosion. More than 90% of erosion is prevented by keeping the soil covered.

2. Inspect your erosion control barriers frequently. This is especially important after a rainfall. If there is muddy water leaving the project site, then your erosion controls are not working as intended. You or your contractor then need to figure out what can be done to prevent more soil from getting past the barrier.

3. Keep your erosion control barrier up and maintained until you get a good and healthy growth of grass and the area is permanently stabilized.

After Construction

1. After your project is finished, seed the area. Note that all ground covers are not equal. For example, a mix of creeping red fescue and Kentucky bluegrass is a good choice for lawns and other high-maintenance areas. But this same seed mix is a poor selection for stabilizing a road shoulder or a cut bank that you don't intend to mow. Your contractor may have experience with different seed mixes, or you might contact a seed supplier for advice.

2. Do not spread grass seed after September 15. There is the likelihood that germinating seedlings could be killed by a frost before they have a chance to become established. Instead, mulch the area with a thick layer of hay or straw. In the spring, rake off the mulch and then seed the area. Don't forget to mulch again to hold in moisture and prevent the seed from washing away or being eaten by birds or other animals.

3. Keep your erosion control barrier up and maintained until you get a good and healthy growth of grass and the area is permanently stabilized.

Why Control Erosion?

To Protect Water Quality

When soil erodes into protected resources such as streams, rivers, wetlands, and lakes, it has many bad effects. Eroding soil particles carry phosphorus to the water. An excess of phosphorus can lead to explosions of algae growth in lakes and ponds called blooms. The water will look green and can have green slime in it. If you are near a lake or pond, this is not pleasant for swimming, and when the soil settles out on the bottom, it smothers fish eggs and small animals eaten by fish. There many other effects as well, which are all bad.

To Protect the Soil

It has taken thousands of years for our soil to develop. It usefulness is evident all around us, from sustaining forests and growing our garden vegetables, to even treating our septic wastewater! We cannot afford to waste this valuable resource.

To Save Money ($$)

Replacing topsoil or gravel washed off your property can be expensive. You end up paying twice because State and local governments wind up spending your tax dollars to dig out ditches and storm drains that have become choked with sediment from soil erosion.

DEP INFORMATION SHEET

Appealing a Department Licensing Decision

Dated: November 2018 **Contact: (207) 287-2452**

SUMMARY

There are two methods available to an aggrieved person seeking to appeal a licensing decision made by the Department of Environmental Protection's (DEP) Commissioner: (1) an administrative process before the Board of Environmental Protection (Board); or (2) a judicial process before Maine's Superior Court. An aggrieved person seeking review of a licensing decision over which the Board had original jurisdiction may seek judicial review in Maine's Superior Court.

A judicial appeal of final action by the Commissioner or the Board regarding an application for an expedited wind energy development (35-A M.R.S. § 3451(4)) or a general permit for an offshore wind energy demonstration project (38 M.R.S. § 480-HH(1)) or a general permit for a tidal energy demonstration project (38 M.R.S. § 636-A) must be taken to the Supreme Judicial Court sitting as the Law Court.

This information sheet, in conjunction with a review of the statutory and regulatory provisions referred to herein, can help a person to understand his or her rights and obligations in filing an administrative or judicial appeal.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

The laws concerning the DEP's *Organization and Powers*, 38 M.R.S. §§ 341-D(4) & 346; the *Maine Administrative Procedure Act*, 5 M.R.S. § 11001; and the DEP's *Rules Concerning the Processing of Applications and Other Administrative Matters* ("Chapter 2"), 06-096 C.M.R. ch. 2.

DEADLINE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written appeal within 30 days of the date on which the Commissioner's decision was filed with the Board. Appeals filed more than 30 calendar days after the date on which the Commissioner's decision was filed with the Board will be dismissed unless notice of the Commissioner's license decision was required to be given to the person filing an appeal (appellant) and the notice was not given as required.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017. An appeal may be submitted by fax or e-mail if it contains a scanned original signature. It is recommended that a faxed or e-mailed appeal be followed by the submittal of mailed original paper documents. The complete appeal, including any attachments, must be received at DEP's offices in Augusta on or before 5:00 PM on the due date; materials received after 5:00 pm are not considered received until the following day. The risk of material not being received in a timely manner is on the sender, regardless of the method used. The appellant must also send a copy of the appeal documents to the Commissioner of the DEP; the applicant (if the appellant is not the applicant in the license proceeding at issue); and if a hearing was held on the application, any intervenor in that hearing process. All of the information listed in the next section of this information sheet must be submitted at the time the appeal is filed.

INFORMATION APPEAL PAPERWORK MUST CONTAIN

Appeal materials must contain the following information at the time the appeal is submitted:

1. *Aggrieved Status*. The appeal must explain how the appellant has standing to maintain an appeal. This requires an explanation of how the appellant may suffer a particularized injury as a result of the Commissioner's decision.
2. *The findings, conclusions, or conditions objected to or believed to be in error.* The appeal must identify the specific findings of fact, conclusions regarding compliance with the law, license conditions, or other aspects of the written license decision or of the license review process that the appellant objects to or believes to be in error.
3. *The basis of the objections or challenge.* For the objections identified in Item #2, the appeal must state why the appellant believes that the license decision is incorrect and should be modified or reversed. If possible, the appeal should cite specific evidence in the record or specific licensing requirements that the appellant believes were not properly considered or fully addressed.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.
5. *All the matters to be contested*. The Board will limit its consideration to those matters specifically raised in the written notice of appeal.
6. *Request for hearing.* If the appellant wishes the Board to hold a public hearing on the appeal, a request for public hearing must be filed as part of the notice of appeal, and must include an offer of proof in accordance with Chapter 2. The Board will hear the arguments in favor of and in opposition to a hearing on the appeal and the presentations on the merits of an appeal at a regularly scheduled meeting. If the Board decides to hold a public hearing on an appeal, that hearing will then be scheduled for a later date.
7. *New or additional evidence to be offered.* If an appellant wants to provide evidence not previously provided to DEP staff during the DEP's review of the application, the request and the proposed evidence must be submitted with the appeal. The Board may allow new or additional evidence, referred to as supplemental evidence, to be considered in an appeal only under very limited circumstances. The proposed evidence must be relevant and material, and (a) the person seeking to add information to the record must show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process; or (b) the evidence itself must be newly discovered and therefore unable to have been presented earlier in the process. Specific requirements for supplemental evidence are found in Chapter 2 § 24.

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license application file is public information, subject to any applicable statutory exceptions, and is made easily accessible by the DEP. Upon request, the DEP will make application materials available during normal working hours, provide space to review the file, and provide an opportunity for photocopying materials. There is a charge for copies or copying services.
2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer general questions regarding the appeal process.
3. *The filing of an appeal does not operate as a stay to any decision.* If a license has been granted and it has been appealed, the license normally remains in effect pending the processing of the appeal. Unless a stay of the decision is requested and granted, a license holder may proceed with a project pending the outcome of an appeal, but the license holder runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge receipt of an appeal, and will provide the name of the DEP project manager assigned to the specific appeal. The notice of appeal, any materials accepted by the Board Chair as supplementary evidence, any materials submitted in response to the appeal, and relevant excerpts from the DEP's application review file will be sent to Board members with a recommended decision from DEP staff. The appellant, the license holder if different from the appellant, and any interested persons are notified in advance of the date set for Board consideration of an appeal or request for public hearing. The appellant and the license holder will have an opportunity to address the Board at the Board meeting. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision or remand the matter to the Commissioner for further proceedings. The Board will notify the appellant, the license holder, and interested persons of its decision.

II. JUDICIAL APPEALS

Maine law generally allows aggrieved persons to appeal final Commissioner or Board licensing decisions to Maine's Superior Court (see 38 M.R.S. § 346(1); 06-096 C.M.R. ch. 2; 5 M.R.S. § 11001; and M.R. Civ. P. 80C). A party's appeal must be filed with the Superior Court within 30 days of receipt of notice of the Board's or the Commissioner's decision. For any other person, an appeal must be filed within 40 days of the date the decision was rendered. An appeal to court of a license decision regarding an expedited wind energy development, a general permit for an offshore wind energy demonstration project, or a general permit for a tidal energy demonstration project may only be taken directly to the Maine Supreme Judicial Court. See 38 M.R.S. § 346(4).

Maine's Administrative Procedure Act, DEP statutes governing a particular matter, and the Maine Rules of Civil Procedure must be consulted for the substantive and procedural details applicable to judicial appeals.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, for administrative appeals contact the Board's Executive Analyst at (207) 287-2452, or for judicial appeals contact the court clerk's office in which your appeal will be filed.

Note: The DEP provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.