FEBRUARY 23, 2025

PROJECT MANUAL

REED ROAD over QUICK STREAM BRIDGE REPLACEMENT PROJECT

WENTWORTH PARTNERS & ASSOCIATES
A Gold Standard Company
31 Commercial Street
P.O. Box 2285
Skowhegan, ME 04976
Office: 207.858.8010

Project Information:

REED ROAD
over
QUICK STREAM
Bridge Replacement Project

Reed Road
Salem Township, Maine 04983

Owner:

The Inhabitants of Franklin County
County Administrative Building
140 Main Street, Suite 3
Farmington, ME 04938

Agent:

Amy Bernard
County Administrator

Prepared by:

Wentworth Partners & Associates, Inc.
31 Commercial Street
P.O. Box 2285
Skowhegan, ME 04976

Project No. 039-23

Original: May 31, 2024
Reissued: January 15, 2025
Reissued : February 23, 2025

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DIVISION 00
000100 INVITATION TO BID

Notice is hereby given that the Inhabitants of Franklin County **[Owner]** will receive sealed bids for the **Reed Road Bridge Replacement Project** until 3:00 PM local time on March 28, 2025 at the offices of Wentworth Partners & Associates, located at 31 Commercial Street, Skowhegan, Maine, at which time and place all bids will be recorded and set for delivery to the Owner. Electronic Bids are acceptable but must be digitally stamped prior to 3:00 pm EDST. Electronic bids shall be addressed to the Engineer-of-Record at:

sgovoni@wpa-design.com

Bids received after time will not be accepted.

Each Bidder must submit a double-sealed envelope with three copies of the bid documents, the outside of which must be clearly marked **Reed Road Bridge Replacement Project.**

Copies of the Project Manual and the Project Drawings may be obtained upon payment of a non-refundable fee of $450.00 per set and made available at the offices of Wentworth Partners & Associates, Skowhegan, Maine, **or** can be sent electronically at no cost upon electronic request to

jcampbell@wpa-design.com

Advertisement shall be made within the Franklin Ciounty website, Franklin County's Daily Bulldog news source, and the Maine Municipal Association. Advertisement shall be posted for at least one week prior to a mandatory pre-bid conference.

A mandatory pre-bid conference at the project location will be held at 9:00 am EST on Thursday, March 13, 2025.

Contractor Q&A period extend from the period Advertisement to 5:00 pm EDST Wednesday, March 26, 2025.

Bids are due 3:00 pm EDST Friday, March 28, 2028

All permitting for this was applied for with the State of Maine Department of Environmental Protection (Maine DEP) and the United States Army Corps of Engineers (USACE). All permits are in place as of May 1, 2024. The project's in-stream work shall be completed between July 15, 2025 and September 30, 2025.

The Franklin County Commissioners reserve the right to accept or reject any or all bids and to waive formalities. No proposal may be withdrawn for at least 30 days after receipt of proposals.

END SECTION 000100 – INVITATION TO BID

DIVISION 00

000200 INSTRUCTION TO BIDDERS

1. The Inhabitants of Franklin County are soliciting bid proposals for a bridge replacement project in Salem Township, Franklin County, Maine. The bid specifications are comprised of the following sections, all of which represent an integral part of the Franklin County's request for bid proposals.

A. Invitation to Bid/Instructions to Bidders
B. Bid Form
C. Bid Bond Form
D. Technical Specifications
   Latest edition of MDOT Standard Specifications for Highways and Bridges
E. Sample Contract
F. Payment and performance bond forms

The project drawings include:
"Project Drawings for Reed Road over Quick Stream for Salem Township", General Sheets G001 through G006, Civil Sheets C001, C002, C101 through C113,and Structural Sheets S001, S002, and S101 through S106 , issued as Revision 4 "*Issued For Construction*", dated February 11, 2025, by Wentworth Partners & Associates.

Also available digitally is the geotechnical report, labeled **Explorations and Geotechnical Engineering Services** "*Luce Bridge #0386 Replacement Reed Road over Quick Stream Salem Township"*, issued June 23, 2023 by S.W. Cole Engineering, Inc.

Prospective Bidders shall become completely familiar with the required work and shall rely on their own investigation. No consideration will be granted for any alleged misunderstanding of the material to be furnished, the work to be done, or for any defects in the final product that are the result of the absence of pre-inspection of a site. Any questions concerning these specifications shall be addressed to:

Steven C Govoni, P.E., M. ASCE
President
Wentworth Partners & Associates
A Gold Standard Company
31 Commercial Street
P.O. Box 2285
Skowhegan, ME 04976
Office: 207.858.8010
Mobile: 207.399.0900
Electronic: sgovoni@wpa-design.com

2. All bids must be submitted on the enclosed bid form supplied by Franklin County and included herein. All bids must be signed and placed in a sealed envelope bearing the name and address of the Bidder and clearly marked "**Reed Road Bridge Replacement Project**" and addressed to:

Wentworth Partners & Associates
A Gold Standard Company
31 Commercial Street
P.O. Box 2285
Skowhegan, ME 04976

All bids must be accompanied by a duly signed and executed bid bond for the amount of 5% of the total bid.

3. Sealed bids are due to the Skowhegan, Maine office of Wentworth Partners & Associates by **3:00 PM EDST Friday, March 28, 2025.** No bid will be accepted after the time specified for bid closing**. All bids received will be recorded at that time.**

4. The bid submittal package shall include:

a) a copy of the Notice to Bid;
b) a completed Acknowledgement of Bid Amendments form;
c) a completed Schedule of Items;
d) two copies of a completed and signed Contract Offer, Agreement & Award form; and
e) a Bid Guaranty.

Bid Guaranty acceptable forms are:

a) a properly completed and signed authentic and guaranteed Bid Bond for 5% of the bid amount;
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. The Contractor agrees to maintain liability insurance in the amount of $2,000,000 to protect it from personal injury, death or property damage claims which may arise from the road projects under this contract. **Franklin County** and **Wentworth Partners & Associates, Inc.** shall be named as an "additionally insured party" under this policy. The Contractor further agrees to indemnify, assume the defense of and save harmless, **Franklin County**, Wentworth Partners & Associates, and any agents and employees thereof from liability, action, claims or damage suffered by any person or association, which results from the willful or negligent action or inaction of the Contractor in the performance of duties and the work performed under this contract. The Contractor shall also carry adequate insurance to cover the risk and requirements specified under the Worker's Compensation Laws of the State of Maine, if applicable. In lieu of Worker's Compensation insurance, the Contractor must provide Independent Contractor Certification from the Worker's Compensation Board. All certificates of insurance must be submitted to the Franklin County before any work begins.

6. Qualifications for Bidders: After the bid opening, Franklin County, herewithin referred to as the **Owner**, may make such investigation as it deems necessary to determine the ability of the Bidding

Contractor to perform the work. Bidders shall furnish to the **Owner** all such information and data for this purpose, as the **Owner** may request. The **Owner** reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the **Owner** that such Bidder is properly qualified to carry out the obligation of the Contract and to complete the work contemplated therein.

7. The **Owner** reserves the right to **ACCEPT OR REJECT** any or all bids in whole or in part.

8. All in-stream work shall be completed between July 15, 2025 and September 30, 2025. Other substantial associated work shall be completed by October 31, 2025.

9. A **mandatory** Pre-bid site meeting shall be held at **9:00 am EST** on **Thursday, March 13, 2025** at the project location.

Contact **George Bell**, Project Manager, directly at **207.416.9591** with any scheduling questions.

END SECTION 000200 – INSTRUCTION TO BIDDER

DIVISION 00
000310 BID FORM

TO: County Commissioners
Franklin County, Maine
County Commissioners' Offices
163 East Main Street
Dover-Foxcroft, ME 04426

RE: Reed Road Bridge Replacement Project
Reed Road over Quick Stream
Reed Road
Salem Township, Maine 04983

1.0 OFFER

Upon inspection of the Site and all matters referred to in the Instructions to Bidders, Bid Documents, and Contract Documents, as prepared by Wentworth Partners & Associates, Inc., and Issued January 20, 2025 for the above-mentioned project in Salem Township, Maine, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Contract Sum as follows:

2025 Lump Sum

$ _____ (numeric)

$ _____ (written)

All prices set forth above shall be in the legal tendency of United States dollars.
All requests, payments, and computations shall be in United States currency.

2.0 ACCEPTANCE

This offer shall be open to acceptance and shall be irrevocable for thirty (30) days from the bid closing date. If this bid is accepted by the Owner, within the time period stated above, we will;

2.1 Execute the Agreement within seven (7) days of receipt of Notice of Award; and
2.2 Commence work upon, but not before, receipt of a Notice to Proceed.

3.0 CONTRACT TIME

If this Bid is accepted, we will provide the required services as follows:

2025

- Immediately order all long lead items.
- Immediately send out all first order notifications, including, but not limited to, county

manager, road commissioner(s), public safety officials, life safety officials, utility companies, land-owners, and other stake holders.

- Prepare site prior to major work start up (i.e. Dig Safe notifications, pre-work photo logs, sedimentation barriers).
- Initiate pre-construction meetings and issue project schedule.
- All in-Stream work shall be performed within the regulated in-Stream work window of July 15, 2025 and September 30, 2025. All in-Stream work shall be completed by September 30, 2025.
- Substantial completion of work by October 31, 2025.

4.0 CHANGES TO THE WORK

When the Engineer establishes that the method of valuation for Changes in The Work will be Net Costs plus a Percentage Fee in accordance with the General Conditions, our percentage Fee shall be:

4.1 _____ percent overhead and profit on the net cost of our own work; and
4.2 _____ percent on the gross cost of work done by any subcontractor.

5.0 ADDENDA

The following Addenda have been received specific to the understanding, scope, and completion of The Work. The modifications to the Contract Documents noted therein have been considered and all costs thereto are included in the Bid Sum.

5.1	Addendum 039-23 01	Issued _____	Dated _____
5.2	Addendum 039-23 02	Issued _____	Dated _____
5.3	Addendum 039-23 03	Issued _____	Dated _____

6.0 APPENDICES

Please find the following Appendices as part of our Bid Submittal:

6.1 Appendix A - List of Subcontractors
~~6.2 Appendix B – Schedule of Values~~
6.3 Appendix C – Schedule of Hourly Equipment and Labor Rates

7.0 SIGNATURES

Please find the attached Signature Form:

(Bidder to submit only the form describing the business entity)

IF BIDDER IS:

CORPORATION

By: _____
(Corporation Name)

_____

(State of Incorporation)

By: _____
(Name of Authorized Person/Title)

Attest _____
(Corporate Seal)

Business Address: _____

_____

Phone No.: (_____)_____Fax No.: (_____) _____

Federal Tax ID No. _____

SUBMITTED ON_____, 2025

IF BIDDER IS:

An Individual

Name (typed or printed)_____

By:_____
(Individual's Signature)

Doing Business As:_____

Business Address: _____

_____

Phone No.: (____)_____Fax No. (_____) _____

E-Mail Address _____

Social Security No. _____

SUBMITTED ON_____, 2025

IF BIDDER IS:

A Partnership

Partnership Name:_____

By:_____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

Business Address: _____

_____

Phone No.: (_____)_____Fax No.: (_____) _____

E-Mail Address: _____

Federal Tax ID No. _____

SUBMITTED ON_____, 2025

APPENDIX A
LIST OF SUBCONTRACTORS

The following is the List of Subcontractors referenced in the Bid Form. All Subcontractor performance and liability shall be our responsibility. All subcontractor work shall be guaranteed as if our own.

SubContractor List

SubContractor	*Division of Work*	*Working Relationship*	*Last Engagement*
Joes Electric Company	Ex. 26000 Electrical	Ex. Numerous Projects	Ex. 2021

APPENDIX B
SCHEDULE OF VALUES

Lump Sum
Bid Only

APPENDIX C
SCHEDULE OF HOURLY EQUIPMENT AND LABOR RATES

Equipment			
Bulldozers	**Rate**	**Minimum**	**Monthly**
Compactor/Pumps	**Rate**	**Minimum**	**Monthly**
2” pump & hoses			
3” pump & hoses			
4” pump & hoses			
6” pump & hoses			
3” mud sucker & hoses			
Excavators	**Rate**	**Minimum**	**Monthly**
Graders	**Rate**	**Minimum**	**Monthly**
Laborers	**Rate**	**Minimum**	**Monthly**
Laborer			
Foreman			
Operator	**Rate**	**Minimum**	**Monthly**
Operator			
Lead Operator			

Equipment			
Loaders	**Rate**	**Minimum**	**Monthly**
Trucks	**Rate**	**Minimum**	**Monthly**
Mileage	**Rate**	**Minimum**	
Mobilization/Demobilization	**Rate**	**Minimum**	**Occurrence**
25 miles			
50 miles			
75 miles			
100 miles			
125 miles			
150 miles			
150+ miles			

END SECTION 000320 – BID FORM

DIVISION 00

000340 BID BOND

A singular reference to Bidder, Surety, Owner or other party shall be plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

BID

Bid Due Date:
Description *(Project Name and Include Location)*:

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum $\_\_\_\_\_$

(Words)(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
Print Name	Print Name
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint ventures, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

   3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

   3.2 All Bids are rejected by Owner, or

   3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state and county in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail,

return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

END SECTION 000340 – BID BOND

DIVISION 00
000400 SUMMARY OF WORK

Work under this contract is located at the crossing of Reed Road over the Quick Stream in Salem Township, Maine. The mapped location is at or about Latitude N 44.892161° Longitude W 70.274031°. Access to the Site is from Maine State Route 142 in Salem Township center. Turn southerly onto Bubier Road/Reed Road. Continue on Bubier Road/Reed Road approximately 0.5 miles to existing bridge crossing.

WORK SUMMARY

The work under which the Contract Documents may be the whole or only a part of is generally described as follows:

This project requires the removal and replacement of the existing bridge structure over the Quick Stream. The on-Site construction process will include, but not be limited to, mobilization, establishment of a second means of access*, installation of the sediment control barriers and buffers, removal of the existing superstructure, removal of the existing substructures, excavation for and installation of the new abutments, reconstruction of the stream banks at the abutments, restoration of the stream bed up- and downstream, installation of the abutment armament, installation of the bridge superstructure, regrading the road and shoulders, reseeding all other areas, removal of the sediment control barriers and buffers, then cleanup and demobilization. The on-Site construction period will require two to three months. All in-stream and below stream work will occur between July 15th and September 30th. All in-water work will occur during the in-water work window. Silt fencing will used in all areas where sediment transport would move toward the stream. Adequate sediment controls shall be installed and maintained throughout the construction process per MDEP BMP. All sediment collected will be relocated to a nearby spent gravel pit. Floating silt fence will be used along the stream edges. NO equipment shall be used in the water. Contractor will observe the Spill Prevention Control & Countermeasures to protect the stream. No refueling will occur within 250 feet of the stream. Loam, seed, and/or mulch will be placed immediately after construction is complete. The contractor shall be MDEP certified for erosion and sediment control practice.

Presently there are five properties of concern located to the south of the bridge crossing. Each property presents a different problem to resolve. Two of the homes, both on the eastern side of Reed Road, are occupied full time. One of the properties at the end of the road has two camps on it. These are only occasionally visited. There is a logging outfit located on the western side of Reed Road. And, lastly, there are the horse pastures and hay fields located on the eastern side that belong to the farmer who lives immediately to the north of the stream crossing. In numerous conversations with the County Administrator, it would seem that the best option shall be presented as a relocation stipend to each owner for the duration of the substantial work. This shall be quantified as the following;

The contractor shall include in their final bid amount a relocation stipend for $30,000.00. This shall be applied as follows: Each resident shall receive a $1,500.00 per week room and

board stipend for four weeks during the most critical construction period.

The contractor shall also add the cost to supply (1) 2000-gallon minimum water tanker, with pump, to remain on the south side of the crossing during construction. The contractor shall also supply (1) two-passenger side-by-side with a stretcher basket for use by emergency services. The contractor will be responsible to start and run each vehicle at the beginning and end of each day. Each vehicle shall be ready to go, at all times, in the case of an emergency. A Knox Box will be placed on site near the vehicles and keys to the vehicles shall be placed inside for 24-hour access by emergency services.

A second four-passenger side-by-side shall be made available for the local residences during working hours only. This will be a shared vehicle. Additionally, a secured location shall be set aside for the local residents to leave their own UTV vehicles near the crossing. A pedestrian bridge over the stream shall be provided for non-impaired (no ADA requirements) individuals during the time of construction. A clear path, with no foot obstructions, to and from the pedestrian bridge to the road shall be required and maintained until the new crossing is in place and passable.

SCHEDULE

All long lead and manufactured components shall be ordered immediately upon acceptance of the signed contract. Notifications for scheduling and sign postings of the upcoming work shall be posted immediately. On-site work may begin as soon as possible. However, any in-stream work will be restricted to the Maine DEP / US Army Corp in-stream window start date of July 15, 2025. All in-stream work will be completed on or before September 30, 2025 with other associated substantial work complete by October 31, 2025. All reseeding and final shoulder work shall be completed as part of the substantial completion. Additional reseeding and shoulder clean-up may be required the following spring, with a final project completion date no later than June 30, 2026.

COORDINATION

No work will begin prior to a two-week minimum notification to Franklin County and the Construction Manager.

TRAFFIC CONTROL

Contractor shall be responsible for providing and maintaining all traffic control and detours including signage, flaggers and notification. See Sheet C002 for instruction.

WORK TO BE INCLUDED:

The work shall include but not be limited the following:

Off Site Work

- ~~Steel fabrication~~ In an effort to save tax payer money, Franklin County has pre-ordered the steel package
- PreCast concrete panel manufacturing
- PreCast concrete abutment and footing manufacturing

- Rebar cage fabrication (if necessary)

Bridge Replacement – In-Stream Work (must be complete by September 30, 2025)
- Mark site and contact DigSafe
- Notifications
- Install block net, turbidity curtain, and other E&SC measures
- Construct cofferdams
- Construct bypass drainage and dewatering
- Remove existing culvert structure and dispose of properly offsite
- Stream bed excavation
- Place footer bed and concrete footers
- Stream bed reconstruction
- Place Abutments
- Assemble wing walls
- Riprap placement for scour protection
- Removal of cofferdam and in-stream nets and curtains

Out-of-Stream Work
- Backfill and associated earthwork
- Slope reinforcement and stabilization
- Fine grading
- Pavement reconstruction
- Guardrail installation
- Loaming, seeding and mulch
- Erosion and sedimentation control measures removal
- Site restoration

SPECIAL CONDITIONS – ACOE GENERAL PERMIT

Special Conditions of the Army Corps of Engineers (ACOE) General Permit shall apply. A copy of the General Permit is attached as Appendix C. There will be a Watershed Restoration Specialist assigned to this project to guide the Contractor with stream restoration compliance.

SPECIAL CONDITIONS – BUILD AMERICA, BUY AMERICA ACT

This project has the requirements of the Build America, Buy America Act (BABA) to expand the list of construction materials required to be manufactured in the United States beyond what is currently only steel/iron products. The Infrastructure Investment and Jobs Act (IIJA), Public Law NO. 11-58 includes the Build America, Buy America Act.

All steel/iron, including steel/iron in construction materials and manufactured products, must satisfy Buy America 23 (CFR 635.410 requirements).

All construction materials, as defined in the following list, that are permanently incorporated into this federally funded project shall meet the Build America, Buy America Act

requirements. For the purpose of this specification, construction materials shall include an article, material, or supply that is, or consists primarily of, the following:

- Non-ferrous metals;
- Plastic and polymer-based products (including polyvinylchloride (PVC), composite building materials, and polymers used in fiber optics cables);
- Glass (including optic glass);
- Lumber; or
- Drywall.

All manufacturing processes for construction materials shall occur within the United States. The category of construction materials excludes cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives. However, products made from these materials shall be produced or manufactured in the United States.

The Contractor shall certify in writing that all permanently incorporated Construction Materials for this contract meet the BABA requirements.

SPECIAL CONDITIONS – Maine DOT Standard Specification

The Maine DOT Standard Specifications (2020 with all addenda) shall be the prevailing specification. However, the Contractor shall replace "Resident" with "Engineer-of-Record" and "Department" with "Engineering Firm" in all sections relevant to the project. Furthermore, no on-Site office trailer is required for the Engineer-of-Record, Construction Manager, and/or testing or inspectional services.

END SECTION 000400 – SUMMARY OF WORK

DIVISION 00
000610 PERFORMANCE BOND

CONTRACTOR *(Name and Address)*:

SURETY *(Name, and Address of Principal Place of Business)*:

OWNER

Inhabitants of Franklin County

CONSTRUCTION CONTRACT

Effective Date of the Agreement: _____

Amount: _____

Description: Reed Road over Quick Stream, Salem Township, Maine

BOND

Bond Number: _____ Date: _____

Amount: _____

Modifications to this Bond Form: □None □ Modifications Attached

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, as dated above.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

1. THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR entered into a certain contract with the OWNER, dated per the Agreement, a copy of which is hereto attached and made a part hereof for the **Reed Road Bridge Replacement Project.**

2. NOW, THEREFORE, if the CONTRACTOR shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extension thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void: otherwise to remain in full force and effect.

3. PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time alteration or addition to the terms of the contract or to the WORK or to the specifications.

4. PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

END SECTION 000610 – PERFORMANCE BOND

DIVISION 00
000620 LABOR AND MATERIAL PAYMENT BOND

Bond Number_____

KNOW ALL MEN BY THESE PRESENTS:

That _____
_____as
Principal, and hereinafter referred to as Principal, and _____,
(Surety Company)

a corporation organized and existing under the laws of the State of _____, hereinafter called Surety, are held and firmly bound unto the _____ _____as Obligee, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the amount of _____ _____ Dollars ($_____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has written agreement dated _____ entered into a contract with Owner for the Construction of **"Reed Road Bridge Replacement Project"** in accordance with drawings and specifications prepared by **Wentworth Partners & Associates, Inc.,** which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract and for the hire of all equipment, tools, and all other things contracted for or used in connection therewith, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject, however, to the following conditions:

(1) A claimant is defined as one having a direct contract with the Principal or with a sub-contractor of the Principal for labor, material, equipment, or other things used or reasonably required for use in the performance of the contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment applicable to the Contract.

(2) The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit by final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

(3) No suit or action shall be commenced hereunder by any claimant:
   (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to all the following:

The Principal, the Owner and the Surety above named, within six calendar months after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of Maine, save that such service need not be made by a public officer.

(b) After the expiration of one (l) year following the date on which Principal ceased all work on said contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitations shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

(c) Other than in a State court of competent jurisdiction in and for the country or other political sub-division of the State in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

(4) The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such lien by presented under and against this bond.

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

In the presence of:

_____ _____
(Principal)

By_____ (seal)
(Witness)

_____ _____
(Surety Company)

By_____ (seal)
(Witness)

END SECTION 000620 – LABOR AND MATERIAL PAYMENT BOND

SECTION 000700 – TECHNICAL SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS

001001 Basic Requirements
001002 Special Provisions

DIVISION 03 - CONCRETE

033000 Cast-In-Place Concrete
033546 Concrete Finishing, Curing and Repairs

DIVISION 31 - EARTHWORK

311000 Site Clearing
311413 Stripping and Stockpiling Topsoil
312000 Earth Work
312213 Rough Grading
312300 Excavation (Excavation and Fill)
312316 Rock Removal
312316.13 Trenching
312323 Structural Backfilling (Fill)
312333 Trench Backfilling, Compaction, Control & Testing
312500 Temporary Erosion Control
312500.13 Environmental Protection

DIVISION 32 - EXTERIOR IMPROVEMENTS

321116 Borrow and Bedding Material (Subbase Courses)
321123 Aggregate Base Course
321216 Asphalt Paving
Concrete Curbing
Pavement Markings
Site Signage
323200 Precast Concrete Block Retaining Wall
329119 Landscape Grading
329219 Seeding

DIVISION 33 - UTILITIES

330526 Buried Utility Markings (Utility Line Signs, Markers and Flags)
334113 Polyvinyl Chloride (PVC) Storm Drainage Piping
334626 Filter Fabric (Geotextile Subsurface Drainage Filtration)

DIVISION 010001 – BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION TABLE OF CONTENTS

A. Perform the following items of work, as shown on the Drawings and specified herein:
   1. Do all excavating and furnish all material necessary for embankment construction, as required to complete the work of this Contract, including the furnishing and compaction of additional material as needed.
   2. Completely remove from the site all excavated material which is not approved by the Engineer for use as embankment material. This provision does not apply to topsoil which will remain the property of the Owner.
   3. Establish subgrades as indicated on the Drawings and specified hereunder.
   4. Protect all trees, shrubs and plantings not designated on the Drawings to be removed, for the duration of the Contract.
   5. Protect all utilities on the site for the duration of the work.

B. Related Work Specified Elsewhere:
   1. Section 312000.13 – Earthwork – Contractor Testing

1.2 CONTRACT DESCRIPTION

This project requires the removal of two aging and undersized 6' diameter corrugated metal culverts at the crossing of Bog Brook. The on-Site construction process will include, but not be limited to, mobilization, installation of the sediment control barriers and buffers, traffic barriers, removal of the existing structures, excavation for and installation of the new abutments, reconstruction of the stream banks at the abutments, restoration of the stream bed up- and downstream, installation of the abutment revetment, installation of the bridge superstructure, reconstruction and regrading of the road and shoulders, setting all approach posts and rails, preparation for and placement of pavement, reseeding all other areas, removal of the sediment control barriers and buffers, then cleanup and demobilization. The on-Site construction period may require three months. All in-stream work will occur between July 15th and September 30th. All in-water work will occur during the in-water work window. Silt fencing, or approved equal, will used in all areas where sediment transport could move toward the stream. Adequate sediment controls shall be installed and maintained throughout the construction process per MDEP BMP. All sediment collected will be relocated to a nearby spent gravel pit. Floating silt fence will be used along the stream edges as required. NO equipment shall be used in the water. Contractor will observe the Spill Prevention Control & Countermeasures to protect the stream. No refueling will occur within 250 feet of the stream. Loam, seed, and/or mulch will be placed immediately after construction is complete. The contractor shall be MDEP certified for erosion and sediment control practice.

There are two major considerations for this project. 1) Notification of the road closure must be in place at both ends of Katahdin Iron Works Road prior to any construction; and 2) this project shall commence in conjunction with the culvert replacement at Katahdin Iron Works Road over the Sucker Brook approximately 3 miles north of this Site. Coordinated construction and road closures are required.

1.3 SCHEDULE OF VALUES

A. Schedule of Values for bid shall be filled out completely.

B. Schedule of Values in duplicate shall be issued within 15 days after date established in Notice to Proceed.

1.4 APPLICANTS FOR PAYMENT

A. Submit three copies on AIA Forms G702 and G703. Contractor's standard or digital form will be considered. Form G703 shall be based on tangible project milestones (i.e. sediment control systems, abutments, structural steel, etc.).

B. Use Schedule of Values for listing items in Applicant For Payment.

C. The Payment Period shall be monthly.

1.5 CHANGE ORDER PROCEDURES

A. Based on proposal request and contractor's fixed quotation or Contractor's request or Change Order as approved by Engineer, Construction Manager, or another approved agent of the Owner.

B. Use Change Order Form as provided. Revise Schedule of Values.

1.6 ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed prior to awarding the Contract.

B. Alternates brought forth after the Contract is awarded shall be approved by the Engineer; at the sole discretion of the Engineer.

C. Modification and/or Coordination of other Work as a result of an Alternate shall be the sole responsibility of Contractor.

1.7 COORDINATION

A. Coordinate scheduling, submittals, and Work of various sections of specifications to ensure efficient and orderly sequence of installation of interdependent construction elements.

1.8 MEETINGS

A. The Construction Manager will schedule a pre-construction meeting after Notice of Award for all affected parties.

B. When required, the Contractor and/or the Construction Manager shall convene a pre-installation meeting at the Project site prior to commencing work on the portion of Work in question.

1.9 PROGRESS MEETINGS

A. The Construction Manager will schedule progress meetings at maximum bi-weekly intervals.

B. Meetings shall require recorded minutes. Meeting minutes shall be distributed within forty-eight hours of the closing of the meeting. Those affected by any decisions made at a meeting shall be included in the distribution.

1.10 SUBMITTAL PROCEDURES

A. The Contractor shall be responsible to provide all submittal documents as per the Contract Documents. The submittal form shall identify the Project, Contractor, Subcontractor, Manufacturer, Fabricator, and/or Supplier, and pertinent Contract Document references.

B. Contractor shall apply Contractor's stamp, signed or initialed, certifying that the review, verification of Product(s), field dimensions, adjacent construction Work, and/r coordination of information is in accordance with the requirements of the Work and Contract Documents.

C. The Contractor shall identify variations from the Contract Documents and Product(s) or system limitations that may be detrimental to the successful performance of the completed Work.

D. Revise and resubmit submittals as required; identify any changes made since the previous submittal.

1.11 QUALITY CONTROL

A. The Contractor shall monitor quality control over suppliers, manufacturers, Products, services, site conditions and workmanship, to guarantee successful performance of the completed Work.

B. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

DIVISION 010002 – SPECIAL PROVISIONS

PART 1 - GENERAL

The following Supplemental Specification and Special Provisions shall amend the "State of Maine Engineering Firm of Record of Transportation, Standard Specifications for Highway and Bridges, Revision of March 2020 including all current additions, amendments, or modifications thereof. In case of conflict, these Supplemental Specifications (1) and Special Provisions (2) shall take precedence and shall govern.

(1) Supplemental Specifications – modifications, additions, and deletions to the existing Standard Specifications.
(2) Special Provisions - Specifications in the contract which are for additional items might not be covered in the Standard Specifications.

A. Working Hours

Work hours shall be limited to 6:00 am to 6:00 pm EDST. There are residences within 500 feet of the project and all caution shall be taken to be respectful of their privacy and rights.

B. Notification to officials, users, and residents

The Contractor shall notify the County and other officials, including, but not limited to, the Sheriffs office, emergency services, utility companies, and private users, sufficiently in advance of any

construction activities that may affect the use of Reed Road. At least one access to homes or businesses south of the project site shall be maintained at all times. In the case of blasting, homeowners within 300 feet shall be notified daily via email of work within their area where a blasting permit is required.

C. Traffic Signs

All existing traffic signs which are to be removed during construction shall be carefully dismounted and post removed and shall be stacked in an area approved by the Engineer. The Contractor shall protect the signs from damage and shall repair or replace, at no additional cost to the County, any damaged sign or post that was damaged as a result of construction operations.

"Stop" signs shall be maintained at their original locations at all times during the progress of the work.

Prior to the start of any construction work the Contractor and the Engineer shall prepare a mutually acceptable inventory of all signs within the project limits which shall be used as a guide for replacements should signs be removed for construction purposes. The signs shall be inventoried by station location and offset, legend of sign and post. The work shall be considered incidental to the project and no direct payment shall be made. All signs shall conform to the MUTCD standards, most current edition.

Removing and resetting of existing signs as required shall be considered incidental to the other contract items and no separate payment shall be made. See Sheet C002 for instruction.

D. Protection of Trees

The Contractor shall be responsible for the preservation of all trees on the project which are not called to be removed. Clearing limits shall be marked prior to removal for approval by the Engineer prior to cutting. Any trees damaged by the Contractor's operations shall be repaired using approved tree dressing or paint in accordance with the appropriate provision of Section 201 of the Standard Specifications. Removal of trees by the Contractor not approved for removal will result in a $500 fine per tree in addition to replacement off the tree with a new 4" caliper tree.

E. Maintenance of Traffic

The contractor shall have full control of the road during the construction period. Posting of the construction activities shall be required at Route 142 and at intersections of other roads (see Sheet C002). Closure barriers shall be required at each crossing. The Contractor shall be responsible for the maintenance and protection of all vehicular and pedestrian traffic at all times during the construction, including weekends, and shall erect and maintain suitable warning signs, flashers, barriers or temporary lighting devices of sufficient size and number to afford protection to the traveling public. The Contractor shall be held responsible for all damage to the work due to any failure of the warning devices to protect the work form the traffic, pedestrians or other causes. The Contractor is responsible for developing a traffic maintenance plan and must obtain approval from the County and the Engineer prior to beginning construction activities.

All traffic control devices and traffic control plan must conform to the latest MUTCD standard, current edition.

Presently there are five properties of concern located to the south of the bridge crossing. Each property presents a different problem to resolve. Two of the homes, both on the eastern side of Reed Road, are occupied full time. One of the properties at the end of the road has two camps on it. These are only

occasionally visited. There is a logging outfit located on the western side of Reed Road. And, lastly, there are the horse pastures and hay fields located on the eastern side that belong to the farmer who lives immediately to the north of the stream crossing. In numerous conversations with the County Administrator, it would seem that the best option shall be presented as a relocation stipend to each owner for the duration of the substantial work. This shall be quantified as the following;

The contractor shall include in their final bid amount a relocation stipend for $30,000.00. This shall be applied as follows: Each resident shall receive a $1,500.00 per week room and board stipend for four weeks during the most critical construction period.

The contractor shall also add the cost to supply (1) 2000-gallon minimum water tanker, with pump, to remain on the south side of the crossing during construction. The contractor shall also supply (1) two-passenger side-by-side with a stretcher basket for use by emergency services. The contractor will be responsible to start and run each vehicle at the beginning and end of each day. Each vehicle shall be ready to go, at all times, in the case of an emergency. A Knox Box will be placed on site near the vehicles and keys to the vehicles shall be placed inside for 24-hour access by emergency services.

A second four-passenger side-by-side shall be made available for the local residences during working hours only. This will be a shared vehicle. Additionally, a secured location shall be set aside for the local residents to leave their own UTV vehicles near the crossing. A pedestrian bridge over the stream shall be provided for non-impaired (no ADA requirements) individuals during the time of construction. A clear path, with no foot obstructions, to and from the pedestrian bridge to the road shall be required and maintained until the new crossing is in place and passable.

F. Materials

All materials shall conform to the requirements specified in the various subsections of the specifications. Equal or alternate materials shall be submitted for approval prior to the bid opening. The Engineer-of-Record shall be the sole decision as to the approval of alternate materials.

G. Survey

The Contractor shall be responsible for establishing and maintaining benchmarks and the Construction baseline. The Contractor shall employ or retain competent Engineering and/or Surveying personnel to fulfill these responsibilities. The Engineer will provide electronic AutoCAD files for use by the Contractor upon request.

H. Sheeting and Bracing

Any sheeting and/or bracing required for the satisfactory installation of drainage, utilities, or excavation will not be paid for separately but shall be considered incidental to the appropriate items.

I. Occupational Health and Safety

The Contractor shall perform all work in accordance of the pertinent requirements of the Occupational Safety and Health Act requirements of the State of Maine and with the regulations of construction as specified by the U.S. Engineering Firm of Record of Labor and Occupational Safety and Health Administration (OSHA) as currently amended.

J. Preconstruction Conference

A preconstruction conference will be held on Site, Salem Township, Maine, at a mutually agreeable time following the award of the contract. At this time, the Contractor shall submit a graphically illustrated construction schedule and a plan showing proposed project activities. In addition to the Contractor, any major subcontractors are required to attend. County officials and representatives of the various funding partners and agencies involved in this project may choose to be in attendance.

It is the purpose of this meeting to inform the various agencies of the proposed work schedule and to allow the opportunity to discuss any project difficulties and to promote cooperation during the implementation of the work.

An additional pre-construction meeting will be held on-site to review flagging of construction limits. Contractor will be responsible to flag limits before meeting.

K. Schedule of Operations

The schedule mentioned in Paragraph J above shall consist of a bar chart detailing the following activities:

- Work Plan / Sequencing of Construction

Although a bar chart is acceptable as a minimum, more complex and detailed schedules (i.e., flow charts, critical path method, etc.) are encouraged and will be acceptable to the County. Updates will be required as work scheduling is modified.

The Contractor shall be responsible for meeting the following milestones:

- September 30, 2025 – In-Stream Work Complete
- October 31, 2025 – Substantial Completion.

Once construction has begun, Contractor is responsible for continuous work. Stopping and leaving the site for other work outside of this contract will not be permitted.

L. Setting Top of Bridge Abutment Grade & Locations

If the Contractor elects to use a laser to set line and grade for the bridge abutment, then the equipment shall be frequently checked to verify that it is accurate and still set to the proper line and grade. If laser equipment is not used then batter boards shall be set at a maximum of 25-foot intervals and the grades transferred to the boards with a transit, level, or line level. Setting abutment grades via use of “pop” level or carpenter’s level will not be permitted.

M. Extent of Open Excavations

The extent of excavation open at any time shall be controlled by OSHA 1926 Subpart P regulations and by existing conditions and the location of work area. In addition, all open trenches will be backfilled at the end of the workday. Exceptions can be made if access to the trench and excavator are properly protected and approved by the Engineer or the Franklin County Project Representative.

N. Flaggers and Traffic Officers

The Contractor shall be responsible for the cost, scheduling, and supervision of any necessary Flaggers, this work is defined in Section 652 of the Standard Specifications. The need for dedicated Traffic Officers is not anticipated.

O. Limits of Operations

The Contractor shall conduct work at all times in such a manner and in such a sequence as will assure the least interference with traffic. They shall not open work to the prejudice or detriment of work already started. The Engineer may require the Contractor to finish a section of which work is in progress before work is started on any additional sections if this is essential to public convenience.

Waste and surplus material shall not be stockpiled but shall be disposed of as designated in the Specifications.

P. Dust Control

The Contractor shall have a water truck on-site for dust control. The required use of a water truck for this project is limited to the north side of the crossing from Maine Route 142 to the first road barriers. This is solely to protect the residences to the north of the crossing from dust migration. Therefore, technically, a full-time water truck is not required for this crossing project but shall be required if dust control is not managed during the construction duration. See Item E for Fire Prevention/Protection.

Q. Questions Regarding Plans and Documents

Questions regarding the Contract Drawings may be directed in writing to:

Steven C Govoni, P.E., M. ASCE
Wentworth Partners & Associates
A Gold Standard Company
31 Commercial Street
P.O. Box 2285
Skowhegan, ME 04976
Office: 207.858.8010
Mobile: 207.399.0900
Electronic: sgovoni@wpa-design.com

All questions from prospective bidders regarding this contract must be received in writing at least three days prior to the stated bid opening date. Questions received after the time may not be addressed in time to complete the bid. Responses from the Engineer that substantially alter this bid will be issued in the form of a numbered addendum to all plan holders registered in the Engineer's Office. Oral explanations and interpretations given before the award of the contract will not be binding.

R. Record Drawings

The Contractor shall keep daily records of all changes in the work, ties to all new service connections and elevations to inverts. Upon completion of the project, the Contractor shall deliver to the Engineer a marked-up set of plans with all changes and required information indicated in red. Final payment is contingent upon the delivery of the "Contractor Record Drawings."

S. Waste Material

All waste material shall be removed from the site and the area left clean upon completion of the work each day. Waste materials shall be properly disposed of. Hazardous materials shall be disposed of properly including a properly documented Chain of Custody. Recyclable materials shall be recycled accordingly. The project Site shall be left in pristine condition.

Any equipment or structures damaged by the Contractor shall be repaired or replaced at no additional cost to the County.

T. Quality Assurance

The Contractor shall be responsible at all times for maintaining top quality assurance during the performance of the work. Particular attention to compaction shall be paid during backfilling operations. Strict adherence to Section 203.11 and 304.11 of the Standard Specifications will be required for all sub- grade and sub-base operations.

Gradation testing - The Contractor shall provide one gradation and proctor per 250 cubic yards of each material used on the project. A minimum of one gradation and proctor per type of material used shall be provided. Gradations and proctors shall be completed by an independent testing lab. The testing shall be incidental to the other contract items. The County reserves the right to complete their own gradations and proctors of materials and any failing tests will be means for rejections of materials.

Compaction Testing - The Contractor shall also be responsible for in-place density of all materials used and shall be conducted by an independent testing laboratory. The density tests will be paid for under item 654.08 Density Tests.

Paving - During paving operations the paving contractor shall have quality control personnel present for the entire operations to check densities. In addition, the paving contractor shall supply copies of their quality control test results within 48 hours after placement of the pavement. The County reserves the right to complete their own testing of the pavement materials and any failing tests will be means for rejection of materials.

U. Sanitary Facilities

The Contractor shall provide self-contained toilet units in sufficient numbers for use if all persons involved in the work.

V. Emergency Facilities

The Contractor shall provide a working tent or trailer where safety and/or emergency first-aid equipment is readily available. This shall include, at a minimum, an eye wash station, a basic first aid kit, and a rehydration station.

W. Subsurface Soil Information

All subsurface soils information, as provided, including but not limited to ledge, boring, refusal, or groundwater elevations, is approximate only and is shown on the Drawings of design purposes only and the convenience of the Contractor. The Contractor shall make his own investigations regarding the actual location and/or nature of such information and shall not rely on or make claims for any extra payments based on the information shown on the drawings. Boring information is incorporated into the plans and logs are available upon request.

X. Test Pit Information

Any geotechnical information furnished or reference in the Construction Documents is for the bidders and contractors use. No assurance is given that the information or interpretations will be representative

of actual subsurface conditions at the time of construction. The County shall not be responsible for the bidder's or contractor's interpretations of or conclusions drawn from the geotechnical information. Data provided may not be representative of subsurface conditions between test pit locations.

Y. Subsurface Aquifer Protection

The project is not over a mapped Sand & Gravel Aquifer. All residences along Reed Road are on private wells with on-site subsurface wastewater disposal systems. Submittal of a Spill Control and Countermeasures Plan for review and approval by the County is required prior to commencement of construction activities.

Z. Tariffs and Steel

This issue has been a major focus for the past two weeks. On Tuesday, February 11th, the County Commissioners, through the work of the County Administrator, voted in favor of pre-ordering the steel package in an effort to lock down the pricing prior to any pricing war or tariff implementation. The County has already paid the initial purchase and shipping installment for steel in the amount of $100,000.00. The county will also cover the remaining steel fabrication, galvanization, and shipping costs. Therefore, the purpose of bidding on this project, each contractor shall use the total bridge superstructure steel package price of **$199,184.00 for their respective contractor's mark-up**. The contractor shall be responsible scheduling delivery, handling, and installation of steel package.

Additionally, the contractor is hereby informed that the steel order has been placed and therefore the steel will be ready for delivery upon request.

AA. Federal Wage Rate

This project does not require the federal wage rate or Davis-Bacon reporting.

BB. Existing Bridge Materials

The existing bridge deck and steel shall be made available for first right of refusal by the County. If the County wishes to store the salvageable materials, the County Administrator shall instruct the contractor of a storage yard within 25 miles of the project location. Contractor shall add an itemized cost for disassembly, loading, delivery and unloading at said location. The contractor shall also inform the County of additional mileage fees for greater distances.

CC. Project Drawings

Project drawings are available at the flowing DropBox link or from the County's website.

https://www.dropbox.com/scl/fi/q29tttv8egi534c8aczrt/039-23-Reed-Road-Quick-Stream-Bridge-Crossing-Salem-Township-ME-Rev-4-Issued-for-Construction-11FEB25.pdf?rlkey=qg37sqsgi4zazvi8u9hvez7m0&st=v8yrjyem&dl=0

DIVISION 030000 - CONCRETE
DIVISION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formwork, shoring, bracing, and anchorage
B. Concrete reinforcement and accessories
C. Concrete

1.2 PRODUCTS INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

A. Anchor bolts — Section 05120, Structural Steel

1.3 REFERENCES

A. ACI 211.1-2022 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
B. ACI 301-2016 - Standard Specifications for Structural Concrete
C. ACI 302.1R-2015 - Guide for Concrete Floor and Slab Construction
D. ACI 304.2R-2017 - Placing Concrete by Pumping Methods
E. ACI 305R-2020 - Hot Weather Concreting
F. ACI 306R-2016 - Cold Weather Concreting
G. ACI 308R-2016 - Standard Practice for Curing Concrete
H. ACI 309R-2005 - Guide for Consolidation of Concrete
I. ACI 318-2019 - Building Code Requirements for Structural Concrete and Commentary
J. ACI 347R-2021 - Guide to Formwork for Concrete
K. ACI 350R-2020 - Environmental Engineering Concrete Structures
L. ASTM A 82-2001 - Specification for Steel Wire, Plain, for Concrete Reinforcement
M. ASTM A185-2001 - Specification for Steel Welded Wire Fabric, Plain for Concrete Reinforcement
N. ASTM A615-2022 - Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement
O. ASTM A706-2022 - Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
P. ASTM A775-2022 - Specification For Epoxy-Coated Reinforcing Steel Bars
Q. ASTM C 33-2018 - Specification for Concrete Aggregates
R. ASTM C 94-2023 - Specification for Ready Mixed Concrete
S. ASTM C150-2007 - Specification for Portland Cement
T. ASTM C260-2010 - Specification for Air Entraining Admixtures for Concrete
U. ASTM C309-2019 - Specification for Liquid Membrane-Forming Compounds for Curing Concrete
V. ASTM C494-2017 - Specification for Chemical Admixtures for Concrete
W. Concrete Reinforcing Steel Institute - Manual of Standard Practice
X. Concrete Reinforcing Steel Institute - Placing Reinforcing Bars

1.4 QUALITY ASSURANCE

A. Perform work in accordance with USACE Best Management Practices for Bank Stabilization using Hard Armoring Activities – Category 2 as modified here-in.

1.5 SUBMITTALS

A. Submit shop drawings for concrete reinforcement prior to fabrication, showing bar bends, details and placement.
B. Submit Concrete Mix designs including past field performance test results.
C. Submit sieve analysis and soundness tests for fine and coarse aggregates.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Plywood: APA, B-B Plyform Class I exterior.
B. Lumber: Southern pine, No. 2 grade or equal.
C. Steel: Minimum 16 ga. sheet, well matched, tight fitting, stiffened to resist loads without excess deflection.
D. Form Liner: Plywood conforming to PS-1, Grade B-B exterior (concrete form) not less than 1/4 inch thick.
E. Form Ties: Factory fabricated assembly providing at least 1.5 inch break back dimension with at least a 1-inch diameter conical wood or plastic cones to leave a uniform hole for patching. Single rod ties require a tightly fitted waterstop washer at the midpoint. Multi rod ties do not require washers.
F. Conform to AASHTO

2.2 REINFORCING STEEL

A. Bars: ASTM A615 Grade 60; deformed new materials; ASTM A706 for bars to be welded.
B. Welded wire fabric: ASTM A185
C. Tie wire: ASTM A82, annealed, Epoxy coated for Epoxy-coated reinforcing.
E. Bolsters, chairs and supports: plastic coated, stainless steel, or epoxy coated.

2.3 FABRICATION OF REINFORCING STEEL

A. Conform to CRSI Code of Standard Practice-Fabrication.
B. Cold bend bars.
C. Bend bars around revolving collar of recommended size.

2.4 CONCRETE MATERIALS

A. Portland cement: ASTM C150; Type II. Tricalcium Aluminate (C_3A) content in cement less than 8%. Cement shall be furnished from one source during the project.
B. Aggregates:
   1. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM Specification C-33, and the following requirements:

Sieve	Percent Passing
No. 4	95 to 100
8	80 to 100

16	50 to 85
30	24 to 60
50	5 to 30
100	0 to 10

Fineness Modulus 2.6 to 3.0

2. Coarse aggregate shall consist of a well graded crushed stone or a washed gravel conforming to the requirements of ASTM Specification C-33.

C. Water: potable from municipal water supply or equal.

D. Admixtures: All from one common manufacturer.

2.5 ADMIXTURES

A. Low Range Water Reducer: Pozzolith 122-N by Master Builders; WRDA with HYCOL by Grace Construction Products Division; or equal meeting ASTM C494 Type A

B. High Range Water Reducer (superplasticiser): Rheobuild 1000 by Master Builders; Daracem 100 by W.R. Grace; or equal meeting ASTM C494 type F.

C. Air entraining agent: Micro-Air by Master Builders, DAREX 11 AEA by Grace Construction Products; or equal meeting ASTM C260.

D. Non-corrosive non-chloride accelerator: Pozzutec 20 by Master Builders; or equal meeting ASTM C494 type C or E.

E. Not permitted: Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions.

2.6 ACCESSORIES

A. Joint filler and slab perimeters: J-Joint polyethylene foam with tear off strip for sealant or approved equal; joint filler to be slab thickness in depth less 0.5 inch for sealant.

B. Expansion joint filler: Self expanding cork by W.R. Meadows or W.R. Grace or equal size as indicated on the Drawings.

C. Epoxy adhesive: Water based epoxy resin/portland cement bonding agent: Armatec 110 by Sika corporation or equal.

D. Bond Breaker: Thompson's Water Seal or equal, or form oil.

2.7 CONCRETE CLASS

A. Reinforced concrete sections greater than 10" thick: Class P

B. Reinforced concrete sections equal to or less than 10" thick: Class P

C. Concrete fill: Class A

D. Topping for precast concrete plank: Class C

E. Mud slab: Class B

F. Sand/Cement Slurry: Class A without Coarse Aggregate

2.8 CONCRETE

A. Concrete proportioning shall conform to ACI except as modified below:

Class	Specified Strength (f'_c)	Coarse Aggregate Size	% Air +(1.5%)	Min.-Max. Slump	Min.-Max. Cem.Fac.	Max. W/C	High Range Water Reducer
A	5000 PSI	No. 57 (1")	6	1-3	564-620	0.42	Yes
B	4000 PSI	No. 67 (¾")	6	1-3	564-620	0.42	Yes

C	3000 PSI	No. 8 (3/8")	6	2-5	517-564	0.50	No
D	2500 PSI	No. 4 (1½")	4	2-5	470-517	0.55	No

B. The maximum slump as indicated in the above table will be as measured at the batch plant.
C. Pumped Concrete: Conform to Chapter 4 - ACI 304.2
D. High range water reducer shall be added on site to obtain 4" - 8" slump.
E. No water shall to be added on site.
F. Concrete shall be furnished from one source during the project.

2.9 SELECTION OF CONCRETE PROPORTIONS

A. The Concrete producer shall select the concrete mix proportions on the basis of past field performance or the use of trial mixes. The changes in materials, and proportions within the population of background tests shall not have been more closely restricted than they will be for the proposed work. The test record shall represent only a single record of consecutive tests that span a period of not less than 45 calendar days. The concrete mix proportions shall produce an average strength at least as great as the required average strength (f'_{cr}).

B. Field Experience

1. Concrete mix proportions shall be established on the basis of field test data with similar materials to be used for the project. Past field experience will be considered suitable if it consists of data from one group of at least 30 consecutive compressive strength tests. To be acceptable, the test data shall be based on similar mix proportions to those for the project.
2. The Standard Deviation (s) shall be computed from such test data and the required average strength (f'_{cr}) to be used for the selection of the concrete proportions shall exceed the specified strength (f'_c) in accordance with the following formulae:
   a. When the standard deviation (s) is less than 500 psi:
      $f'_{cr} = f'_c + 1.34s$
   b. When the standard deviation (s) is greater than or equal to 500 psi:
      $f'_{cr} = f'_c + 2.33s - 500$
3. When a Concrete producer does not have test data meeting the requirements listed in Section 2.11.B.1, but does have data based on a single group of 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and modification factor indicated below. To be acceptable, the test data shall be based on similar mix proportions to those for the project.

No. of tests	Modification factor for standard deviation
15	1.16
20	1.08
25	1.03
30 or more	1.00

4. When a Concrete producer does not have test data meeting the requirements listed in Section 2.11.B.3, but does have data based on a set of two groups of consecutive tests totaling at least 30. To be acceptable, none of the two groups shall consist of less than 10 tests with similar mix proportions to those for the project. The group containing 15 or more test results which have different mix proportions from those for the project shall be within 1,000 psi of the specified strength. A standard deviation shall be established as the

product of the calculated standard deviation based upon the group containing 15 or more test results and modification factor indicated above.

5. Document that the calculated average strength for the proposed concrete proportions, using past field performance data for the proposed concrete proportions consisting of at least 10 consecutive test records, is at least greater than or equal to the required average strength (f'_{cr}). If the past field performance data consists of two groups of strength tests for two different mixes, plot the average strength versus the water cement ratio of the two mixes. Interpolate between the corresponding mixture proportions to determine the mixture proportions for the required average strength (f'_{cr}).

C. Laboratory Trial Batches

1. When an acceptable record of field test results is not available, concrete proportions established from trial mixtures meeting the following restrictions shall be permitted:
   a. Combination of materials shall be that for proposed work.
   b. The required average compressive strength (f'_{cr}) shall be 5,000 PSI.
   c. Trial mixtures having proportions and consistencies required for proposed work shall be made using at least three (3) different water-cementitious materials ratios which will be less than or equal to 0.42 and will produce a range of strengths encompassing the required average strength (f'_{cr}).
   d. The maximum cement factor as listed in Section 2.10.A shall not be exceeded.
   e. Trial mixtures shall be designed to produce a slump within + or - 0.75 in. of maximum permitted, and for air entrained concrete, within + or - 0.5 percent of maximum air content.
   f. For each water-cementitious materials ratio, at least three (3) test cylinders for each test age shall be made and cured in accordance with ASTM C 192. Cylinders shall be tested at 7, 21 and 28 days.
   g. Maximum water-cementitious materials ratio for concrete to be used in proposed work shall be selected by the curve to produce the average strength required (f'_{cr}).

D. Adjustments to Required Average Strength (f'_{cr}).

1. Adjustments in the Required Average Strength (f'_{cr}) may be made during the progress of the work on the following basis:
   a. When a minimum of fifteen 28-day tests from this project are available, the average strength and standard deviation shall be computed. Should these determinations indicate an excessive compressive strength with a low standard deviation, the Engineer may allow modification of the concrete mix to achieve a lower average strength based upon a new standard deviation. In the event such determination should indicate a lower average strength or higher Standard Deviation than anticipated, the Engineer will require corrective measures to be taken immediately which may include one or more of the following but not limited to:
      (1) An increase in the cementitious material
      (2) Changes in mixture proportions
      (3) Reductions in or better control of levels of slump supplied
      (4) A reduction in the delivery time
      (5) Closer control of air content.
      (6) Decrease in the water-cement ratio.

(7) An improvement in the quality of the testing, including strict compliance with standard test procedures.
(8) To test the fifth cylinder immediately or at 56 days.

2.10 STORAGE OF MATERIALS

A. Protect materials from ground and the elements.
B. Maintain cement in dry condition.
C. Store reinforcement on skids.
D. Remove defective materials from site. Do not store on site.

PART 3 - EXECUTION

3.1 FORMWORK

A. Conform to ACI 301 and ACI 347
B. Verify lines, levels and measurements before proceeding.
C. Erect plumb and straight. Maintain rigid. Brace sufficiently.
D. Allow no concrete leakage. Provide continuous, straight, smooth exposed surfaces.
E. Treat forms with form release agent. Protect reinforcing from contact with form release agent.
F. Earth forms not permitted.
G. Camber formwork as necessary.
H. Clean out inside of forms of all foreign materials prior to concrete placement.
I. Maintain forms and shores supporting the cast concrete for the time periods indicated:
   1. Walls and Vertical Surfaces
      (Non-water retaining) ***72 Hours**

      * These periods represent cumulative number of days or hours during which the temperature of the air surrounding the concrete is above 50°F and the concrete has been damp and no loss of moisture has occurred.
J. Reshore as required.
K. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form release agent as specified for new formwork.
L. All concrete formwork, including reinforcing steel and embedment items, shall have a temperature greater than or equal to 35°F at the time of concrete placement.

3.2 REINFORCEMENT

A. Conform to the CRSI Code of Standard Practice - Field Erection for surface condition, bending, spacing and placement tolerance.
B. Weld no reinforcement unless no exceptions are taken by Engineer in writing.
C. Splicing reinforcement: conform to AASHTO ; welded wire fabric to be lapped 1½ courses or 12 inches; tie fabric at 24 inches on center maximum spacing.
D. Provide bar supports: on grade use concrete brick; elsewhere use manufactured wire supports.
E. Do not bend reinforcing partially embedded in the concrete.
F. Mechanical connections shall be installed in accordance with splice device manufacturer's recommendations.
G. Epoxy coating damaged shall be repaired with patching material conforming to ASTM A775.

H. All parts of mechanical connections on epoxy coated reinforcing bars, including steel splice sleeves, bolts and nuts shall be coated with the same material used for repair of epoxy coating damage.

3.3 EMBEDDED ITEMS

A. Coordinate installation of embedded items.
B. Place all items secure.
C. Pipes or Conduits for embedment within a slab, wall or beam, other than those merely passing through, shall satisfy the following:
   1. Shall not be larger in outside diameter than one-third (1/3) the thickness of the slab, wall or beam.
   2. Shall not be spaced closer than 3 diameters on center.
   3. Shall not impair significantly the strength of the concrete.

3.4 PLACING CONCRETE

A. Notify Independent Testing Laboratory 24 hours minimum prior to each placement.
B. Assure placement and proper location of all embedded items.
C. Place no concrete on frozen ground.
D. Place concrete from mixing truck to final location quickly and without segregation.
E. Place concrete within 90 minutes of batching.
F. Freefall: 4 feet maximum.
G. Place continuously and against plastic concrete only.
H. Do not place partially hardened concrete.
I. Consolidate concrete by vibrating. Penetrate preceding lift 4 inches to blend layers. Do not use vibrator to move fresh concrete laterally. Insert vibrator at approximately 18-inch intervals. Consolidate concrete without segregation. Conform to ACI 309.
J. Conform to ACI 306R for cold weather concreting when environmental conditions exist as defined in Section 03346, Part 1.5.
K. Conform to ACI 305R for Hot Weather Concreting when environmental conditions exist as defined in Section 03346 Part 1.5.
   1. Temperature of concrete placed shall not exceed 90°F.
L. Provide concrete Delivery Slip prepared at batch plant with each truck load of concrete showing ticket number, date, truck number, mix strength, maximum stone size, weight of coarse aggregate, weight of fine aggregate, cement weight, volume of concrete, gallons of water added at plant, time water added at plant, quantities of all admixtures used.
M. High Range Water Reducing admixtures shall be used for all concrete to be pumped or with a specified water/cement ratio below 0.50. Maximum slump 8 inches with admixture.
N. Use non-corrosive, non-chloride accelerator when placing concrete in air temperatures below 50°F.
O. Thoroughly moisten subgrade materials prior to placing slabs on grade.
P. Horizontal wall construction joints deeper than 8' from top of placement, place one inch of sand cement slurry prior to placing concrete.
Q. Thoroughly clean the surface of the concrete at construction and control joints and remove laitance prior to placing adjoining concrete. Do not place concrete against the hardened side of a joint for at least 48 hours.

3.5 JOINTS

A. Saw cut control joints for slabs on grade within 24 hours of placement.
B. Provide joints only where shown on the drawings or as otherwise approved after written request.

3.6 MODIFICATIONS OR REPAIRS TO EXISTING CONCRETE

A. Field measurements shall be taken at the required structures to determine the quantity of concrete to be removed and/or repair and the amount of patching to be done.
B. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work, and to prevent damage to the structures or contents by falling or flying debris.
C. Remove concrete to the depths shown or required. Roughen concrete surfaces by chipping, sandblasting or scarifying.
D. Surfaces must be clean and sound. Surfaces may be dry, damp, or wet, but free of standing water. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles, and disintegrated materials by mechanical abrasion methods such as sandblasting.
E. Exposed reinforcement shall be cleaned by wire brushing and where shown the reinforcement shall be cut or bent. Additional reinforcement shall be provided as shown on the Drawings.

3.7 DRILLING AND GROUT DOWELS

A. Use rotary drills and cores (non-percussive) and drill holes into concrete to the depth indicated. Hole size shall be one inch (1 in.) larger in diameter than the dowel diameter unless otherwise noted.
    1. Drill holes may be offset 2 inches plus or minus from set locations, but shall not be drilled within six inches (6 in.) of the free edge of concrete
B. Scour the dowel hole by thoroughly roughening the sides with a coarse, wire flue brush.
C. Clean hole of dust and debris with a power vacuum.
D. Fill hole with non-shrink grout; insert dowel with twisting motion; add grout as needed.
E. Maintain dowel stationary until grout cures.

3.8 TOLERANCES

A. Maximum allowable deviations from dimensions, elevations, slopes and positions as indicated.
    1. Variation from plumb:
        a. In the lines and surfaces of columns, piers, walls, and in arises:
            In any 10 ft. of length ..... 1/4 in.
            Maximum for the entire length ..... 1 in.
        b. For exposed corner of columns, control-joint grooves, and other conspicuous lines:
            In any 20 ft. length ..... 1/4 in.
            Maximum for the entire length ..... 1/2 in.
    2. Top elevation of columns, piers, walls and arises ..... $\pm$1/4 in.
    3. Top elevation of slabs ..... $\pm$1/4 in.
    4. Footings*

a. Variations in dimensions in plan:
   Minus ..... 1/2 in.
   Plus ..... 2 in.
b. Misplacement or eccentricity:
   2 percent of the footing width in the direction
   of misplacement but not more than ..... 2 in.
c. Thickness:
   Decrease in specified thickness ..... 5 percent
   Increase in specified thickness ..... No limit
d. Elevation of top ..... ±1/4 in.

*Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.2

3.9 FAILURE TO MEET STRENGTH REQUIREMENTS

A. The strength of the concrete in place will be considered substandard if any one of the following results occur:
   1. The arithmetic average of 28-day cylinder tests for any three (3) consecutive test results are less than the specified strength (f'_c).
   2. More than 10 percent of the 28-day cylinder tests have strengths less than the specified strength (f'_c).
   3. An individual compressive strength test result falls below the specified strength (f'c) by more than 500 psi.
B. Concrete which fails to meet the strength requirements as outlined above will be reviewed by the Engineer. The Engineer will determine whether the substandard concrete will be accepted, rejected or additional tests performed.
C. When Substandard concrete as defined in Section 3.11 paragraphs A.1 and A.2 occurs, the Engineer will require corrective measures to be taken immediately, as listed in Section 2.11.D, in order to increase the average of subsequent strength tests.
D. When substandard concrete as defined in Section 3.11 paragraph A.3 occurs the Engineer may require cores drilled in the area of question in accordance with Specification 03305 paragraph 3.2.B. If the core tests are inconclusive or impractical to obtain, load tests may be required and their results evaluated in accordance with ACI 318 Chapter 20. If the average of the three cores is less than 85% of the specified 28-day strength or if one core is less than 75% of the specified 28-day strength, then that portion of the structure shall be strengthened by a method proposed by the Contractor and no exceptions taken by the Engineer or replaced by the Contractor at no additional cost to the Owner.
E. Concrete not requiring strengthening but still falling below the strength requirements as outlined in Section 3.11 paragraph A may be accepted by the Owner in accordance with Article 13 of the General Conditions, specifically the paragraph entitled "Acceptance of Defective Work".

3.10 DEFECTIVE CONCRETE

A. Defective concrete is defined as concrete in place, which does not conform to strength, shapes, alignments, appearances and/or elevation as shown on the drawings and/or presents faulty surface areas.
B. Reinforcing steel size, quantity, strength, position, or arrangement at variance with the Drawings will be considered defective.

C. Concrete which differs from the required dimensions or locations in such a manner as to reduce the strength will be considered defective.
D. Concrete surfaces not finished or cured in accordance with Section 03346 - Concrete Finishing, Curing, and Repairs shall be classified as defective concrete.
E. Formed surfaces larger or smaller than dimensional tolerances specified in this Division may be rejected. If the Engineer permits the Contractor to correct the error, such correction shall be as directed and in such a manner as to maintain the strength, function and appearance of the structure.
F. Concrete members cast in the wrong location may be rejected and shall be removed at no additional cost to the Owner if the strength, appearance or function of the structure is adversely affected.
G. Inaccurately formed surfaces exposed to view may be rejected and shall be repaired or removed and replaced at no additional cost to the Owner.
H. Concrete exposed to view with defects which adversely affect the appearance of the specified finish shall be repaired. If, in the opinion of the Engineer, the defects cannot be repaired, the concrete may be accepted or rejected in accordance with the decision of the Engineer.

3.11 PROTECTION FROM COLD

A. Concrete structures shall be covered, insulated and heated as required to prevent frost penetration beneath the structures until acceptance by the Owner.

END OF DIVISION 033000

DIVISION 033546 - CONCRETE FINISHING, CURING AND REPAIRS

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Concrete Curing
- B. Concrete Finishing
- C. Concrete Repairs

1.2 RELATED SECTION
- A. Section 01340 - Submittals
- B. Section 03300 - Cast-in-Place Concrete
- C. Section 03604 - Non-Shrink Grout
- D. Section 07115 - Resealable Membrane Waterproofing
- E. Section 07120 - Fluid Applied Waterproofing
- F. Section 07150 - Dampproofing
- G. Section 07900 - Joint Sealers
- H. Section 09900 - Painting
- I. Section 09965 - Abrasion Resistant Coatings

1.3 REFERENCES
- A. ACI 301-96 - Standard Specifications for Structural Concrete
- B. ACI 302.1R-89 - Guide for Concrete Floor and Slab Construction
- C. ACI 305R-91 - Hot Weather Concreting
- D. ACI 306R-88 - Cold Weather Concreting
- E. ACI 308-92 - Standard Practice for Curing Concrete
- F. ACI 350R-89 - Environmental Engineering Concrete Structures
- G. ASTM C309-93 - Specification For Liquid Membrane - Forming Compounds for Curing Concrete

1.4 SUBMITTALS
- A. None.

1.5 ENVIRONMENTAL CONDITIONS
- A. Cold Weather and Hot Weather are defined when temperatures will fall below 40°F during the week following placement or will be above 90^{O}F, respectively.

PART 2 - PRODUCTS

2.1 FINISHING MATERIALS
- A. Patching Mortar: 1 part of a mixture of white and grey Portland cement to 2.5 parts of damp loose sand. Cement type to match substrate.

2.2 REPAIR MATERIALS
- A. Epoxy Adhesive: Armatec 110 by Sika Corporation or equivalent.

B. Repair Mortar: polymer improved, cementitious, 2 component, trowel grade mortar equal to Concrete Coat by Euclid Chemical; Sikatop 122 by Sika Corp. or equivalent.

PART 3 - EXECUTION

3.1 FINISHES

A. Repair all holes and defects and allow to set prior to finishing concrete.
B. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.
C. Finish concrete surfaces as scheduled.

3.2 FINISHING SLABS AND FLATWORK

A. Screed to bring concrete surface to proper contour and elevation.
B. Highway straightedge, bull float or Darby float the concrete surface immediately after screeding.
C. Allow bleed water to evaporate or remove.
D. (STF) Steel Troweled Finish (All Floors): Float the surface with magnesium or cast aluminum float or with a power-finishing machine. Steel trowel surface immediately after floating to produce smooth surface. Steel trowel again after concrete has hardened enough so that mortar does not adhere to trowel edge. Ringing sound should be apparent when performing second troweling due to tilted, compacting motion.
F. (LBF) Light Broom Finish for equipment pads): wood float finish as in E above; while plastic draw a soft-bristled broom, over the concrete in long even strokes with downward pressure.
H. Tolerances for trowel finished floors: ACI 302 class BX. 5/16 inch maximum deviation from 10 foot long straightedge placed anywhere on the surface.

3.3 FINISHING VERTICAL SURFACES

A. (RFF) Rough Form Finish: Repair structural defects only and patch tie holes as specified in paragraph 3.5 - STRUCTURAL DEFECTS. Fins exceeding 1/4 in. in height to be removed by grinding and/or rubbing.

3.4 CURING

A. Curing: Curing shall begin immediately following the initial set of concrete or after slab surface finishing has been completed and shall continue after form removal. All concrete shall be cured to attain strength and durability by one of the following methods for a minimum of seven days after placement regardless of the ambient air temperature:
    1. Ponding or continuous sprinkling. Intermittent wetting and drying is not an acceptable curing method.
    2. Application of absorptive mats of fabric kept continuously wet.
    3. Continuous application of steam or fog spray.
    4. Application of waterproof sheet materials.

B. Moisture loss from surfaces placed against wooden or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed. After form removal, the concrete shall be cured by one of the methods described above, for the balance of time remaining as specified above.

C. Cold Weather:
    1. Maintain concrete temperature between 50^{o}F and 70^{o}F for a minimum of seven days after placement, enclose and heat, insulate as required.

2. Protect concrete from damage due to concentrated heat sources.
3. Reapply curing compounds every two days during heating period.
4. The maximum allowable temperature drop of the concrete surfaces during the first 24 hours after the end of the curing period shall not exceed 5°F in any 1 hour.

D. Hot Weather: Concrete temperature shall not be greater than 90°F. Protect from loss of slump, flash set, plastic cracking and rapid evaporation of water.

E. Place concrete quickly, shade from direct sun and protect from wind. Concrete shall be cured by one of the methods described in paragraph 3.4.A for seven days after placement.

3.5 SURFACE DEFECTS

A. As soon as the forms have been stripped and the concrete surfaces exposed, repair all surface defects. Surface defects include all form tie holes, honeycombed areas and surface blemishes including air voids and bug holes with a nominal diameter or depth greater than ¼ inch, visible construction joints, fins, burs and other defects. All concrete repair work shall result in a concrete surface of uniform color and texture, and shall be free of all irregularities. Honeycombed and/or rat holes larger than 50 cubic inches are considered a structural defect.

B. Cut out and remove honeycombed areas and rock pockets down to solid concrete, but in no case to a depth less than 1 inch, by means of hand chisels or pneumatic chipping hammers. Saw cut the edges perpendicular to the surface. No featheredges shall be allowed.

C. Remove all loose aggregate paste and debris and scrub clean; thoroughly wet area to be repaired; brush and scrub grout paint into the substrate of the area to be repaired.

D. Apply a stiff consistency of patching mortar to the area with a trowel; apply prior to the set of grout paint (but after it has cast its water sheen): leave patched surface slightly higher than surrounding surface; do not finish for 1 hour minimum. Cure in same manner as adjacent concrete.

E. Mix patching mortar using as little water as possible; allow to stand with frequent manipulation of trowel to achieve stiffest consistency; blend white and gray Portland cement to achieve color match with surrounding concrete.

F. Form Tie Holes: After cleaned and thoroughly dampened, apply grout paint and fill tie holes solid with patching mortar.

G. Finished Flatwork exceeding specified tolerances:
1. High areas shall be repaired by grinding after the concrete has cured 14 days.
2. Low areas shall be repaired by cutting out low areas and replaced with concrete. Finish repair area to match adjacent concrete.

3.6 STRUCTURAL DEFECTS

A. Remove and replace or repair all structural defects. Structural defects include honeycombed areas and/or rat holes greater than 50 cubic inches, areas which cracking, spalling or other signs of deterioration are present or develop during the initial curing or thereafter until accepted by the Owner. The Contractor shall propose a specific repair method, suitable for the situation, and the Engineer will review the method prior to the repair.

B. Cut out and remove defective concrete, honeycombed areas and rock pockets to sound concrete by means of hand chisels or pneumatic chipping hammers. Saw cut 1-inch minimum the edges perpendicular to the surfaces. If honeycomb exists around reinforcement, chip to provide a clear space at least 1 inch wide all around the reinforcement. Moisten surfaces and

allow to dry until damp. Apply bonding agent. Apply a polymer-modified cement with 3/8-inch coarse aggregate. Cure as required by manufacturer.

C. Random Cracks:
   1. Random shrinkage or structural cracks shall be repaired utilizing a low viscosity, 100% solids, two (2) component epoxy resin system. Remove all dust, debris or disintegrated material from crack or void by use of oil-free compressed air or vacuuming.
   2. Crack or void must be dry at time of application. Cracks saturated with oil or grease must be chipped out to unsaturated concrete. "Vee" out cracks in horizontal surfaces slightly.
   3. Where cracks extend through members and are accessible, seal bottom of crack, which is to receive the epoxy. Apply epoxy in strict accordance with manufacturer's recommendations.
   4. Epoxy resin system shall be Sika chemical Corporation "Sikadur Hi-Mod LV", or equal.
   5. Patching of vertical wall or overhead cracks shall be accomplished in the same manner using a similar epoxy material of higher viscosity as recommended by the manufacturer.

D. Excessive Cracking:
   1. Floor slabs containing an excessive amount of cracks as defined herein, and which will remain exposed, shall receive an epoxy mortar topping after sealing of cracks in accordance with the above paragraph.
   2. Excessive cracking shall be defined as areas containing racks averaging $1/64^{th}$-inch wide or greater, and in excess of 15 linear feet of cracks per 100 square feet of slab. In the event that excessive cracking occurs in isolated areas of a given floor, topping will only be required in the area of the cracks bounded by construction, expansion, or control joints.
   3. Topping shall be Sika Chemical Corporation "Sikadur Lo-Mod LV Mortar" or equal.

E. Spalls:
   1. All weakened, damaged or disintegrated concrete shall be removed to sound concrete. For defective areas involving only the surface and/or the finish of the concrete, reference Section 03350, Concrete Finishes, for surface defects.
   2. For spalled areas involving depths generally less than three (3) inches, utilize epoxy mortar for repair, Sika Chemical Corporation "Sikadur Lo-Mod LV Mortar" or equal.
   3. For spalled areas involving depths generally in excess of three (3) inches, utilize an epoxy bonding compound and concrete grout. Bonding compound shall be Sika Chemical Corporation "Sikadur Hi Mod" bonding agent or equal.

3.7 PROTECTION

A. Protect concrete from high and low temperatures for seven days.
B. Protect against vibration until concrete has attained 33% of its 28-day strength.
C. Protect against premature loads until the 28-day strength has been attained.

END OF DIVISION 033456

DIVISION 034100 – PRECAST STRUCTURAL CONCRETE
DIVISION 034116 – PRECAST CONCRETE SLABS

FROM MAINE DOT STANDARD SPECIFICATIONS

SECTION 535 - PRECAST, PRESTRESSED CONCRETE SUPERSTRUCTURE

535.01 Description This work shall consist of casting and erecting precast/prestressed concrete products and related material. Materials, work, inspection and documentation not specifically addressed by this Specification shall be done in accordance with the applicable sections of the Precast/Prestressed Concrete Institute (PCI), Manual for Quality Control for Plants and Production of Structural Precast Concrete Products (MNL 116), including Commentary.

ALL REQUIREMENTS IN THIS SPECIFICATION ARE THE RESPONSIBILITY OF THE CONTRACTOR, UNLESS NOTED OTHERWISE.

535.02 Materials Materials for precast/prestressed concrete products shall meet the requirements of the following Subsections of the Standard Specifications:

Portland Cement and Portland Pozzolan Cement	701.01
Water	701.02
Air-Entraining Admixtures	701.03
Water Reducing Admixtures	701.04
High Range, Water Reducing, Admixture (HRWR)	701.0401
Set-Retarding Admixtures	701.05
Fly Ash	701.10
Calcium Nitrite Solution	701.11
Silica Fume	701.12
Ground Granulated Blast Furnace Slag	701.13
Fine Aggregate for Concrete	703.01
Coarse Aggregate for Concrete (Class A, AA or Latex)	703.02
Reinforcing Steel	709.01
Welded Steel Wire Fabric	709.02
Steel Strand	709.03

Portland cement shall conform to AASHTO M85 (ASTM C150), Type I, Type II, or Type III or AASHTO M 240. Supply the Engineering Firm of Record with copies of Certified Mill Test Reports for the cement.

Provide a Materials Certification from the manufacturer of the prestressing strand. The certification shall include a representative load elongation curve for each coil. The manufacturer shall identify each coil of strand. Do not remove the identification from the coil. Partial coils may be used with the approval of the Fabrication Engineer. Failure to maintain traceability of a coil will be cause for rejection. Provide Certified Mill Test Reports for the reinforcing steel, welded wire fabric and fusion bonded epoxy coating.

535.03 Working Drawings Prepare shop detail, erection and other necessary Working Drawings in accordance with Section 105.7, Working Drawings. The Engineering Firm of Record will review the drawings in accordance with the applicable requirements of Section 105.7, Working Drawings. Changes and revisions to the reviewed Working Drawings will require further review by the Fabrication Engineer.

Concrete mix designs shall be part of the Working Drawing submittal. Include aggregate specific gravity, absorption, percent fracture, fineness modulus and gradation as part of the mix design. Provide the mix design calculations demonstrating how the batch weights, water-cement ratio and admixture dosage rate were determined.

535.04 Plant The plant shall be a PCI Certified facility.

535.05 Facilities for Inspection Provide a private office at the fabrication plant for the Engineering Firm of Record's inspection personnel, or Quality Assurance Inspectors (QAI's). The office shall be in close proximity to the Work. The office shall be climate controlled to maintain the temperature between 68° F and 75° F and have the exit(s) closed by a door(s) equipped with a lock and 2 keys which shall be furnished to the QAI's.

The QAI's office shall meet the following minimum requirements:

Description	Quantity
Office area (minimum ft2)	
Drafting table surface (ft2)	
Drafting stools-each	
Office desk	
Ergonomic swivel chairs	
Folding chairs	
High-speed internet connection (ports) or wireless	
Fluorescent lighting of 100 ft-candles minimum for all work areas	
110 Volt 60 cycle electric wall outlets	
Wall closet	
Waste basket with trash bags	
Broom	
Dustpan	
Water cooler	
Cleaning materials-floor, surfaces, windows, for duration of the project	

The Contractor will be responsible for disposing of trash and supplying commercially bottled water for the water cooler.

The QAI will have the option to reject any furniture or supplies provided to the QAI's office, based on general poor condition.

Provide parking space for the QAI(s) in close proximity to the entrance to the QAI's office. Maintain the pathway between the parking area and the QAI's office so that it is free of obstacles, debris, snow and ice.

The facilities and all furnishings shall remain the property of the Contractor upon completion of the Work. Payment for the facilities, heating, lighting, internet connection and monthly internet charges and all furnishings shall be incidental to the Contract.

Failure to comply with the above requirements will be considered denial of access to the Work for the purpose of inspection. The Engineering Firm of Record will reject all Work done when access for inspection is denied.

535.06 Notice of Beginning Work Give the Engineering Firm of Record a minimum of two-weeks notice for in-Maine work and three-weeks notice for out-of-Maine work, prior to beginning production. If the production schedule changes, notify the Fabrication Engineer no less than 3 working days prior to the initial start-up date. Any Work done without the QAI present will be rejected. Advise the Fabrication Engineer of the production schedule and any changes to it. If Work is suspended on a project, the Fabrication Engineer will require 72-hours notice prior to the resumption of Work.

535.07 Quality Assurance / Quality Control (QA/QC) is the responsibility of the Contractor.

Provide a copy of the Quality System Manual (QSM) to the Fabrication Engineer, if requested.

Calibrate all production equipment in accordance with MNL 116, except that stressing jacks shall be calibrated every 6 months. Provide calibration certifications to the QAI prior to beginning fabrication. Calibrate scales, admixture dispensers and water gauges at the frequency specified in MNL 116. Use proving rings, load cells and solid standard weights, as applicable. The calibration shall be performed by a testing laboratory acceptable to the Engineering Firm of Record using calibration equipment the accuracy of which is traceable to a National Institute of Standards and Technology (NIST) standard.

Quality Control Inspectors (QCI's) shall have a valid PCI Quality Control Certification Level I, Level II or Level III. Personnel performing concrete testing shall hold a current ACI Field Testing Technician Grade I Certification, or equivalent.

Inspect all aspects of the Work in accordance with the Contractor's QSM. Reject materials and workmanship that do not meet Contract requirements.

Record measurements and test results on the appropriate forms from APPENDIX E of MNL 116, or an equivalent form prepared by the user. Provide copies of measurements and test results to the QAI as follows:

Type of Report	When Provided to QAI*
Aggregate gradations-fine aggregate and coarse aggregate	Prior to beginning work and at least once a week thereafter
Material certifications / stressing calculations / calibration certifications	Prior to beginning work (anticipate adequate time for review by QAI)
Tensioning report	The same work day
Pre-placement inspection report	Prior to the concrete placement
Concrete batch slips	The morning of the next work day
Results of concrete testing	The morning of the next work day
Results of compressive strength testing (for release)	The same work day
Concrete temperature records	Provide with compressive strength testing (for release)
Nonconformance reports/repair procedures	Within 24 hours of discovery
Results of compressive strength testing (for design strength)	Prior to stopping curing
Post-placement inspection report	Within 48 hours of achieving design strength

* The Contractor and QAI may, by mutual agreement, modify any part of the schedule; however, failure to provide the documentation when required by the Fabrication Engineer will result in the product being deemed unacceptable. The Contractor may perform testing in addition to the minimum required. The results of all testing shall be made available to the Engineering Firm of Record.

535.08 Quality Assurance Quality Assurance (QA) is the prerogative of the Engineering Firm of Record.

The QAI will perform acceptance sampling and testing and will witness or review documentation, workmanship and testing to assure the Work is being performed in accordance with the Contract Documents.

The QAI has the authority to reject materials and products that do not meet the Contract requirements, including Work rejected due to denial of access or the lack of adequate notice of the beginning of production. The acceptance of material or workmanship by the QAI will not preclude subsequent rejection, if found unacceptable by the Engineering Firm of Record, at a later date.

535.09 Nonconforming Work Correct or replace nonconforming material and/or workmanship. Generate a nonconformance report (NCR) describing the nonconformance and the proposed corrective action; provide a copy to the QAI and forward a copy to the Fabrication Engineer for review.

In the event that an item does not meet the Contract requirements but is deemed suitable for use by the Engineering Firm of Record, said item may be accepted in accordance with Section 106.8, Non-Conforming Work, of the Standard Specifications.

535.10 Forms and Casting Beds Construct forms in accordance with the Working Drawings. The forms shall be well constructed, carefully aligned and sufficiently tight to prevent leakage of mortar. Reject forms that do not maintain the dimensions shown on the Working Drawings. Inspect the bulkheads after each cast and repair or replace worn or damaged pieces.

Seal wooden forms to prevent absorption of water. Apply and cure the sealer in accordance with the manufacturer's product data sheet.

Remove all paint, adherent material, foreign matter and debris prior to placing concrete.

Apply a non-staining bond-breaking compound to the forms in accordance with the manufacturer's product data sheet. Solvent clean reinforcing steel and strand contaminated with the bond-breaking compound.

535.11 Reinforcing Steel Fabricate, package, handle, store, place, splice and repair reinforcing steel in accordance with Section 503 of the Standard Specifications.

Accurately locate and securely anchor the reinforcing steel to prevent displacement during concrete placement. Install and secure all reinforcing steel prior to beginning the concrete placement.

The concrete cover shown on the reviewed Working Drawings shall be the minimum allowable cover. Use sufficient bar supports and spacers to maintain the minimum concrete cover. The bar supports and spacers shall be made of a dielectric material or other material approved by the Fabrication Engineer.

535.12 Voids and Inserts Voids shall be non-absorbent. The out-to-out dimensions of the voids shall be within 2 percent of Plan dimensions. Repair damaged voids in a manner acceptable to the Fabrication Engineer. Store, handle and place voids in a manner that prevents damage.

Accurately locate and securely anchor, securely cap and vent the voids in the form. Any portion of a void that is displaced beyond the allowable dimensional tolerances shall be cause for rejection of the slab or beam.

Open the void drains immediately upon removing the product from the form. Recess inserts 1 inch, unless noted otherwise on the Plans.

The Engineering Firm of Record is not responsible for verifying the location of inserts or other hardware installed for the convenience of the Contractor.

535.13 Concrete New concrete mix designs and mix designs not previously approved by the Fabrication Engineer shall be qualified by trial batches prepared in accordance with AASHTO T 126 (ASTM C192). The test results shall demonstrate that the concrete meets the requirements of the Plans and this Specification. If accelerated curing is to be used in production, the test specimens shall be similarly cured.

The concrete mix design shall meet the following requirements:

Minimum cement content	658 lbs./cubic yard
Water-cement ratio *	0.40 (maximum)
Air entrainment	5-½ % to 7-½ %
Allowable Slump Flow for Self- Consolidating Concrete (SCC)	20 inches to 30 inches
Visual Stability Index(VSI) for SCC	VSI of 0 or 1, per ASTM C1611. If a mortar paste halo is present, it shall not exceed 0.25 inch.
Corrosion inhibitor **	3 gal. /c.y. (unless otherwise specified)
Silica Fume (when used)	5% to 10% of cement content by weight
Fly Ash (when used)	40% of cementitious material (maximum)
Slag (when used)	50% of cementitious material (maximum)

* For the purpose of calculating water cement ratios, one U.S. gallon of water shall be considered to weigh 8.34 pounds.
** The water in the corrosion inhibitor solution shall be included when calculating the water-cement ratio.

The concrete mix design shall be proportioned so that the concrete achieves transfer strength within twenty-four hours of the completion of the placement if the release strength is 6,000 psi, or less. If two consecutive placements fail to meet the above requirements, no further placements shall take place until corrective action is taken by the Contractor.

535.14 Concrete Placement Do not batch or place concrete until all the form(s) for any continuous placement have been inspected and accepted by the QCI, and the QAI concurs.

Test concrete in accordance with the following Standards:

AASHTO T 22 (ASTM C39) Test Method for Compressive Strength of Cylindrical Concrete Specimens
AASHTO T23 (ASTM C31) Practice for Making and Curing Concrete Test Specimens in the Field
AASHTO T141 (ASTM C172) Practice for Sampling Freshly Mixed Concrete AASHTO T152 (ASTM C231) Test Method for Air Content of Freshly Mixed Concrete
by the Pressure Method
AASHTO T196 (ASTM C173) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C1064 Test Method for Temperature of Freshly mixed Portland Cement Concrete
ASTM C1611 Standard Test Method for Slump Flow of Self-Consolidating Concrete

Test the first two loads of concrete for temperature, air entrainment and slump flow for SCC. If the first load is unacceptable, test the second load as the first. Continue this process until two consecutive loads are acceptable. After two consecutive loads are acceptable, the frequency of testing shall be at the discretion of the QAI.

If there is a change in the dosage rate of any admixture or a change of more than 5°F in mix temperature, then test the concrete for temperature, air entrainment and slump flow for SCC.

Test every load of 1 cubic yard, or less, from a stationary mixer or 2 cubic yards, or less, from a transit mixer for temperature, air entrainment and slump flow for SCC, prior to placing the concrete in the forms.

Perform all testing in the presence of the QAI. The QAI will designate the loads to be tested. Make cylinders used to determine release strength during the last one-third of the placement.

Place the concrete as nearly as possible to its final location. Control the depth of each lift in order to minimize entrapped air voids. The maximum depth of an unconsolidated lift shall be 18 inches. Vibrate the concrete with internal or internal and external vibrators. Do not use external vibrators, only. Insert internal vibrators vertically and penetrate the lower layer of concrete by at least 4 inches. Insert the vibrators in the concrete to assure that the radii of action of the vibrators overlaps. Hold the vibrators in position from 5 to 15 seconds; vibration time shall be reduced by 50 percent when placing SCC. Do not use vibrators to move concrete horizontally. Each lift of concrete shall have sufficient plasticity to be consolidated with subsequent lifts.

Do not re-temper the concrete with water after discharging has begun. The Contractor may add HRWR to the concrete after batching, if that practice conforms to the manufacturer's product data sheet. Discard concrete that becomes unworkable.

Do not use water or water-based products to aid in finishing fresh concrete.

After the concrete has been placed and finished, and before the forms are covered, remove all concrete from projecting reinforcing steel.

Measure and record the concrete cover at each void location after void hold-downs have been removed. The QAI will indicate the number and location of the measurements.

535.15 Acceptance and Quality Control Testing of Concrete Acceptance of structural precast/prestressed units, for each day's production, will be determined by the Engineering Firm of Record, based on compliance with this specification and satisfactory concrete testing results. At least once per week, the QAI will make 2 concrete cylinders (6 cylinders when the Contract includes permeability requirements) for use by the Engineering Firm of Record; cylinders shall be standard cured in accordance with AASHTO T23 (ASTM C31). The QAI will perform entrained air content and slump flow testing, determine water-cement ratio and determine temperature of the sampled concrete at the time of cylinder casting. All testing equipment required by the QAI to perform this testing shall be provided in accordance with Standard Specification Section 502.041, Testing Equipment. In

addition, the Contractor shall provide a slump cone meeting the requirements of AASHTO T 119. Providing and maintaining testing and curing equipment shall be considered incidental to the work and no additional payment will be made.

Quality Control concrete test cylinders shall be made for each day's cast and each form bed used. Cylinders tested to determine strand release strength and design strength shall be field cured in accordance with AASHTO T23 (ASTM C31). 28-day cylinders shall be standard cured. Record unit identification, entrained air content, water-cement ratio, slump flow and temperature of the sampled concrete at the time of cylinder casting

If the Contractor fails to make enough cylinders to demonstrate that the product meets the Contract requirements, the product will be considered nonconforming work.

The compressive strength of the concrete will be determined by averaging the compressive strength of two test cylinders made from the same sample. For the purpose of detensioning prestressed products, neither of the test cylinders shall have a compressive strength less than the minimum required transfer strength. For the purpose of determining design strength, the average of two cylinders shall meet or exceed the design strength, and the difference in strength between the two shall be no more than 10 percent of the higher strength cylinder.

Perform compressive strength testing to determine transfer and design strength in the presence of the QAI. Cylinder tests not witnessed by the QAI will not be acceptable.

535.16 Curing by Moisture Retention Cure the concrete in accordance with MNL 116, Section 4.20. Moist cure the concrete until it has reached design strength.

Do not use membrane- forming curing compounds without the approval of the Fabrication Engineer. If membrane-forming curing compounds are authorized, follow the requirements of MNL 116 and the curing compound manufacturer's published recommendations.

535.17 Accelerated Curing of Concrete (Optional) Cure the concrete in accordance with MNL 116, Section 4.19, except as modified herein.

After initial set, the temperature gain of the concrete shall not exceed 40□F per hour. Initial set shall be determined in accordance with ASTM C403, Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance; a strength gain of 500 psi indicates initial set. The maximum allowable concrete temperature shall be 160□F. Concrete temperature shall be measured near each end of the casting bed and at intervals not to exceed 100 feet. In order to qualify for accelerated cure, the concrete temperature shall attain a minimum temperature of 120□F; that temperature shall be maintained for a minimum of 8 hours and the concrete shall achieve a minimum of 80 percent of design strength.

Detension precast/prestressed products immediately after the completion of the curing cycle while the products are warm and moist. The accelerated curing cycle shall be considered complete when the method of supplying heat is stopped and/or the concrete temperature drops below 120°F. Two cylinders shall be tested immediately upon completion of the accelerated cure cycle. Products that

have not achieved all of the above criteria shall be moist cured until the concrete has achieved design strength.

If the precast/prestressed concrete products have achieved 80 percent of design strength during the accelerated curing cycle, no further curing will be required.

535.18 Prestressing Tension the strands in accordance with MNL 116 and this Specification.

Provide stressing calculations to the QAI prior to tensioning strands. Do not tension the strands until the QAI has reviewed the calculations. Apply initial force and final force to the strands in the presence of the QAI. The QCI shall be present to monitor and document the application of initial force, final force and the elongation of the strands.

Tension strands in an orderly sequence to avoid snags and entanglements. When strands from two, or more, coils are used, identify the locations of the different strand lots.
Calculate the elongation and adjusted gauge pressure readings for each modulus of elasticity and cross-sectional area of the strands.

Prior to tensioning, cycle the hydraulic jacking devices until the hydraulic fluid reaches normal operating temperature.

After initial tensioning, establish a permanent and clearly visible reference mark on the strand to determine strand elongation after final tensioning. Measure the strand elongation to the nearest 1/16 inch.

If the strands have been tensioned for more than 48 hours without concrete being placed in the forms, test a minimum of 10 percent of the strands, but not less than two strands in each row and not less than two strands in draped strand arrays, by applying the theoretical force used during the final tensioning to each of the strands. If additional elongation is gained, subtract the amount gained from the theoretical elongation. If the result of the theoretical elongation minus the gain in elongation is less than the minimum allowable elongation for any of the strands tested, apply the final force to all strands. Do not measure total elongation from the original reference mark. Accept properly tensioned strand based on the force applied to the strands.

Measure and record the chuck-to-chuck distance on self-stressing beds after tensioning the first set-up and at any time the number of strands or strand array changes. Confirm that the measurement used in the stressing calculations is the same as the field measurement.

535.19 Detension the strands in accordance with MNL 116 and this Specification. Use a carburizing flame. Heat a minimum length of 6 inches of the strand slowly so that only one wire is released at a time. Cut both ends and any intermediate points simultaneously. Failure to maintain symmetry of cutting or causing sudden shock to the product will make it subject to rejection. Detension the strands in the presence of the QAI and QCI.

Measure any strand slippage on all precast/prestressed concrete products. Mark all strands prior to detensioning. Measure a minimum of four strands per row. The QAI will choose the strands to be measured.

535.20 Finishing Concrete and Repairing Defects Precast/prestressed concrete products fabricated under this Section shall meet Standard Grade finish requirements as defined in MNL 116, except that the Contractor shall rub fascia units in accordance with Section 502 of the Standard Specifications. Abrasive blast fascia surfaces prior to finishing. The Contractor may use alternative methods of achieving an acceptable finish on fascia units, if approved by the Fabrication Engineer.

Repair honeycombing, ragged or irregular edges and other non-structural or cosmetic defects using a patching material from the Engineering Firm of Record Qualified Products List (QPL). The repair, including preparation of the repair area, mixing and application and curing of the patching material, shall be in accordance with the manufacturer's product data sheet.
Corners that are not exposed in the final product may be ground smooth with no further repair necessary if the depth of the defect does not exceed 1/2 inch. Remove form ties and other hardware to a depth of not less than 1 inch from the face of the concrete and patch the holes using a patching material from the Engineering Firm of Record QPL.

Repair structural defects only with the approval of the Fabrication Engineer. Submit a nonconformance report (NCR) to the Fabrication Engineer with a proposed repair procedure. Do not perform structural repairs without an NCR that has been reviewed by the Fabrication Engineer. Structural defects include, but are not be limited to, exposed reinforcing steel or strand, cracks in bearing areas, through cracks and cracks 0.013 inch in width that extend more than 12 inches in length in any direction. Give the QAI adequate notice prior to beginning any structural repairs.

Make chamfers and drip notches smooth and uniform. Sandblast keyways to remove mortar paste prior to shipping. Recess strand ends 1 inch and patch the holes with a patching material from the Engineering Firm of Record QPL. Coat the entire ends of the precast/prestressed concrete units with a bituminous protective coating unless otherwise specified on the Plans or as directed by the Fabrication Engineer.

535.21 Precast/prestressed Deck Panels Produce precast/prestressed deck panels in accordance with the Plans and Specifications. Cure the deck panels in accordance with Sections 535.16 or 535.17.

535.22 Tolerances Product dimensional tolerances shall be in conformance with the latest edition of MNL 116, Appendix B, as applicable to the particular product (e.g., slab, I- girder. box beam), the Plans and this Specification. Use Box Beam fabrication tolerances for voided slabs and use Double T tolerances for NEXT beams. In case of dispute, the Fabrication Engineer shall determine the allowable tolerance.

535.23 Transportation and Storage Handle and store material using lifting devices.
Handle and transport precast/prestressed units so that the reactions with respect to the unit shall be approximately the same during transportation and storage as in its final position. Do not transport units until the 28-day design strength has been attained.

Support stored precast/prestressed units above the ground on dunnage in a manner to prevent twisting or distortion. Protect the units from discoloration and damage.

Repair or replace precast/prestressed concrete units damaged by improper storing, hoisting or handling.

535.24 Installation of Slabs, Beams and Girders Finish bearing areas to the elevations shown on the Plans and in accordance with Section 523, Bearings, as applicable.

Lift the units using the lifting devices cast into them. Support I-Girders at the abutments and piers to prevent overturning. Place beams and slabs in their final location in a manner that assures that the keyways are spaced properly and the post-tensioning ducts are in alignment. Use compressible gaskets around duct openings within keyways to prevent blocking of the duct with grout.

Prior to grouting, initially post-tension slabs or beams to 5,000 lbs. force, per strand.
Make a permanent and clearly visible reference mark on each strand after it has been initially post-tensioned in order to determine strand elongation after final post-tensioning.

Immediately prior to grouting, clean the keyways between slab or box units and soak the keyways with water in order to prevent absorption of water from the grout. Seal the bottom of the keyways to prevent the loss of grout.

Fill longitudinal keyways between slabs or beams with a non-shrink, flowable, cementitious grout with a minimum design compressive strength of 6,000 psi at 28 days.

The grout shall be a material for keyways from the Engineering Firm of Record QPL. Mix, place and cure the grout in accordance with the manufacturer's product data sheet. The Contractor may propose the use of an alternate grout material supplied from a Engineering Firm of Record approved ready mixed concrete batch plant. Ready mixed grout shall achieve a design compressive strength of 6,000 psi at 28 days, have an entrained air content of between 6.0 and 9.0 percent, be
non-shrink, flowable, and contain a non-shrink additive listed on the Engineering Firm of Record QPL for expansive cements. The proposed grout mix design shall be submitted to the Engineering Firm of Record for approval.

Do not perform final post-tensioning of slabs or beams less than 24 hours after completion of the grouting operation. Final post-tension precast/prestressed concrete slabs or beams to 41,000 lbs. force per strand, unless otherwise specified on the Plans. Provide a jacking device that has been calibrated in accordance with MNL 116. Provide calibration documentation, a calibration curve and stressing calculations to the Engineer-of-Record, allowing adequate time for review. Do not post-tension slabs or beams until the documentation has been reviewed by the Engineering Firm of Record. Post-tension the slabs or beams in the presence of the Engineer-of-Record. No vehicular traffic, including the Contractor’s equipment, shall be allowed on the bridge until post-tensioning is complete.

Saw cut or abrasive cut the post-tensioning strand of slabs or beams no closer than 1-¼ inches from the wedges after tensioning is complete. Coat the strand ends and wedges with a corrosion inhibiting grease and cap the ends with a watertight cover.

Pack and neatly finish the post-tensioning recesses of slabs or beams with a grout made of the same brand and type of cement used to cast the slabs or beams. Clean the post- tensioning recesses prior to packing the grout.

535.25 Installation of Precast/Prestressed Deck Panels Erect deck panels as shown on the Plans or reviewed Working Drawings, as applicable. Adjust the bottom-of-slab elevation using threaded jacking devices cast into the panels, or by other means approved by the Engineer-of-Record.

Fill the voids between the top of the beam and the bottom of the panels, as shown on the Plans, reviewed Working Drawings or Standard Details, as applicable, with a non-shrink, flowable, cementitious grout with a minimum design compressive strength of 6,000 psi at 28 days. The grout shall be a material for keyways from the Engineering Firm of Record QPL. Mix, place and cure the grout in accordance with the manufacturer's published product data sheet. Provide vent holes at 3-foot intervals to avoid air locks. The Contractor may propose the use of an alternate grout material supplied from a Engineering Firm of Record approved ready mixed concrete batch plant. Ready mixed grout shall achieve a design compressive strength of 6,000 psi at 28 days, have an entrained air content of between 6.0 and 9.0 percent, be non-shrink, flowable, and contain a non-shrink additive listed on the Maine DOT QPL for expansive cements. The proposed grout mix design shall be submitted to the Engineering Firm of Record for approval.

Prevent concrete leakage between the deck panels using caulking, backer rod or other methods approved by the Engineer-of-Record.

Remove all visible contaminants from the deck panels and protruding reinforcing steel by abrasive blast cleaning or high pressure (minimum of 8,000 psi) water cleaning, prior to placing the deck concrete.

535.26 Method of Measurement Prestressed structural concrete items will be measured by the lump sum, except that precast deck panels will be measured as part of the structural concrete slab Pay Item(s).

535.27 Basis of Payment Acceptable work done under Precast, Prestressed Concrete Superstructure will be paid for at the Contract lump sum price for the respective Pay Item; all work associated with precast deck panels will be considered incidental to the structural concrete slab Pay Item(s). Payment will be full compensation for furnishing all materials, labor and equipment in the precast/prestressed work, including concrete, strand, reinforcing steel, anchor dowels and related items. Related items will include, but not be limited to: Working Drawings, preformed pads, transportation, erecting the units, drilling and grouting of anchor dowels, grouting of keyways, panels and ducts, tensioning and post-tensioning operations, and required concrete admixtures.

Payment will be made under:

Pay Item		Pay Unit
535.60	Prestressed Structural Concrete Slab	Lump Sum
535.61	Prestressed Structural Concrete I-Girders	Lump Sum

535.62	Prestressed Structural Concrete Box Beams	Lump Sum
535.622	Prestressed Structural Concrete NEXT Beam	Lump Sum

END OF DIVISION 034100
END OF DIVISION 034116

END OF DIVISION 030000

DIVISION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Remove surface debris.
B. Clear site of plant life and grass.
C. Remove trees and shrubs.
D. Remove root system of trees and shrubs.
E. Topsoil excavation.

1.2 RELATED SECTIONS

A. Section 312213 - Rough Grading.
B. Section 312300 – Excavation (Excavation and Fill)
C. Section 312316.13 – Trenching
D. Section 312333 – Trench Backfilling, Compaction, Control & Testing

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable code for disposal of debris.
B. Coordinate clearing Work with existing utilities.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that existing plant life designated to remain is tagged or identified.

3.2 PROTECTION

A. Locate, identify, and protect utilities that remain, from damage.
B. Protect trees, plant growth, and features designated to remain, as final landscaping.
C. Protect bench marks and existing structures from damage or displacement.

3.3 CLEARING

A. Clear areas required for access to site and execution of Work.
B. Remove trees and shrubs as designated on the site plan. Remove stumps and root systems and chip on-site.
C. Clear undergrowth and deadwood, without disturbing subsoil.

3.4 REMOVAL

A. Remove debris, rock, and extracted plant life from site.
B. Do not burn any material to be removed unless the owner's representative grants permission and all required permits are secured.
C. Do not bury trees, stumps, or other material otherwise indicated as to be removed.

3.5 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded.
B. Remove from site.

DIVISION 311413 - STRIPPING AND STOCKPILING TOPSOIL

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Work Included: segregate topsoil approved by the Engineer prior to excavation, trenching and grading operations and stockpile it for use in the work.
B. Related Work Specified Elsewhere (When Applicable): demolition, clearing, grading, embankment, excavation and landscaping are specified in the appropriate sections in this division.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil shall consist of friable loam of at least two percent decayed organic matter (humus), free of subsoil, and reasonably free of clay lumps, brush, roots, weeds, and other objectionable vegetation, stones and similar objects larger than one (1) inch in any dimension, litter and other materials unsuitable or harmful to plant growth. It shall contain no toxic materials.
B. The quality of the topsoil material to be used shall be subject to approval by the Engineer.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Remove topsoil from the areas that are likely to be disturbed as a result of construction operations to a depth based on the soil profile, as approved by the Engineer. Remove topsoil from all designated areas prior to the performance of normal excavation.

3.2 STORAGE

A. Transport topsoil and deposit in storage piles convenient to the areas, which are subsequently to receive the application of topsoil.
B. Stockpile topsoil separate from other excavated materials in areas approved by the Engineer.
C. Take all necessary precautions to prevent other excavated material and objectionable material from becoming intermixed with the topsoil before, during and after stripping and stockpiling operations.
D. Neatly trim and grade stockpiles to provide drainage from surfaces and to prevent depressions where water may become impounded.
E. Construct temporary erosion control devices for all stockpiled material, subject to the Engineer's approval.
F. All loam stripped and stockpiled shall be seeded with 70% Annual/30% Perennial Rye Grass.

END OF DIVISION 311413

DIVISION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. Perform the following items of work, as shown on the Drawings and specified herein:
   1. Do all excavating and furnish all material necessary for embankment construction, as required to complete the work of this Contract, including the furnishing and compaction of additional material as needed.
   2. Completely remove from the site all excavated material which is not approved by the Engineer for use as embankment material. This provision does not apply to topsoil which will remain the property of the Owner.
   3. Establish subgrades as indicated on the Drawings and specified hereunder.
   4. Perform cutting and removal of existing pavements to the extent indicated on the Drawings and as required for the work under this Contract.
   5. Protect all trees, shrubs and plantings not designated on the Drawings to be removed, for the duration of the Contract.
   6. Protect all utilities on the site for the duration of the work.

B. Related Work Specified Elsewhere:
   1. Section 312000.13 – Earthwork – Contractor Testing

1.2 DEFINITIONS

A. The work involved includes removal, haul and disposal of materials to prepare for construction and the placing and compaction of material to construct embankments.
B. Excavation shall be designated as common, rock, unclassified or muck.
   1. Common excavation shall consist of removal of earth, of boulders, solid mortared stone masonry and concrete masonry when each is less than two cubic yard in volume and of rock which can be removed with ordinary excavating machinery. Grubbing shall be considered as common excavation.
   2. Rock excavation shall consist of removal of solid rock which cannot be excavated without the use of explosives or ripping equipment and of boulders, solid mortared stone masonry and concrete masonry having a volume of two cubic yard or more.
   3. Unclassified excavation shall consist of removal of materials without consideration to their composition.
   4. Muck excavation shall consist of excavation of soils and organic materials which are not suitable for use in embankment.
C. Embankment construction shall consist of constructing roadway embankments, including preparation of the areas upon which they are to be placed; site grading around buildings and structures; the construction of parking areas, lawns, berms, and dikes; the placing and compacting of approved material within areas where unsuitable material has been removed; and the placing and compacting of embankment material in holes, pits and other depressions within the roadway area or construction site limits.
D. Related Work Specified Elsewhere: (When Applicable)

1. Stripping and Stockpiling of Topsoil; Trench Excavation-Earth; Trench Excavation-Ledge; Borrow and Bedding Material; Trench Backfilling, Compaction, Control and Testing; Temporary Erosion Control and Dewatering are specified elsewhere in this division.

1.3 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. All work shall be performed and completed in accordance with all local, state or federal regulations.
   2. The General Contractor shall secure all necessary permits from, and furnish proof of acceptance by, the local and state Engineering Firm of Records having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.

B. Grade and Elevations:
   1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the contract installation.

C. Compaction:
   1. The Contractor shall compact all embankment materials in accordance with this specification.
   2. Density testing shall be performed by an Independent Testing Laboratory retained by the Owner and acceptable to the Engineer and Contractor.
   3. Independent Testing Laboratory shall determine in place densities in accordance with ASTM D1556 or other methods approved by the Engineer.
   4. Independent Testing Laboratory shall submit one (1) copy of the following reports to each of the following: Engineer, Engineer-of-Record Project Representative, Contractor;
      a. Test reports on material
      b. Field density test reports
      c. One moisture density curve for each type of soil encountered

   5. Location of Tests:
      a. One test per 300 feet of completed roadway subgrade just prior to placement of subbase gravels and additional tests at depths as required by the Engineer.
      b. Two tests on finished subgrade in parking area just prior to placing the subbase gravels and additional tests at depths as required by the Engineer.
      c. One test per 300 feet of completed railroad subgrade after fine grading and just prior to placement of the loam and additional tests at depths as required by the Engineer.
      d. Tests on lagoon embankments shall be taken on every 1,000 c.y. of dike material. Also, in order to determine optimum water content, maximum allowable lift and number of equipment passes required, one test section shall be constructed, and thoroughly tested. To avoid conflicts the Contractor shall allow a minimum of one working day for testing to be conducted on the test section. The test section may be part of the lagoon embankment.
   6. If the test results fail to meet the requirements of these specifications, the Contractor shall correct the situation and obtain a passing test. The cost of reworking the material to obtain a passing test shall be borne by the Contractor and no allowance will be made for delays in the performance of the work. All testing and retesting shall be conducted by the Independent Testing laboratory. Costs of retesting will be paid by Owner. The cost of retesting will be

determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.

1.4 JOB CONDITIONS

A. Disposition of Utilities:

1. The locations of utilities shown on the plans are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warranties that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities within the project area.
2. Rules and regulations governing the respective utilities shall be observed in executing all work in this section. Active utilities shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable. If, in the progress of excavation, any utility should become damaged and result in any damage to public or private property, the General Contractor shall restore to the original condition, at no additional cost to the Owner, anything which has been damaged or disturbed.

PART 2 - PRODUCTS

2.1 DEFINITIONS OF GRAVEL, SAND AND SILT CLAY

A. The terms "gravel", "coarse sand," "fine sand" and "silt-clay," as determinable from the minimum test data required in this classification arrangement and as used in subsequent word descriptions, are defined as follows:

1. Gravel - Material passing sieve with 75 mm (3-inch) square openings and retained on the 2.00 mm (No. 10) sieve.
2. Coarse Sand - Material passing the 2.00 mm (No. 10) sieve and retained on the 0.425 mm (No. 40) sieve.
3. Fine Sand - Material passing the 0.425 mm (No. 40) sieve and retained on the 0.075 mm (No. 200) sieve.
4. Silt-Clay (Combined silt and clay) - Material passing the 0.075 mm (No. 200) sieve.
5. Boulders (retained on 77 mm (3-inch) sieve) should be excluded from the portion of the sample to which the classification is applied, but the percentage of such material, if any, in the sample should be recorded.
6. The term "silty" is applied to fine material having plasticity index of 10 or less and the term "clayey" is applied to fine material having plasticity index of 11 or greater.

2.2 SOIL MATERIALS

A. Use of Excavated Material:

1. To the extent they are needed, all suitable materials from the specified excavation may be used in the construction of required embankment and slope protective devices (riprap).
2. Surplus excavated materials suitable for filling operations shall not be wasted, but will be stockpiled for future use as directed by the Engineer within the Town's property. This specific location will be determined at the start of construction.

3. Unsuitable material shall consist of grubbings or other materials which contain rock of size exceeding specifications, organic materials, or other materials of a deleterious nature as deemed by the Engineer. Silts, clays and granular materials with more than 8% passing the number 200 sieve shall be considered unsuitable for embankment in the Frost Penetration Zone under paved areas when sufficient water supply is available to cause heaving.

B. Common borrow shall consist of approved material required for the construction of embankments or for other portions of the work as designated and shall be obtained from a source off-site, except as otherwise noted. Common borrow shall be free from frozen material, clay, perishable rubbish, peat, organic and other deleterious materials.

C. Gravel borrow shall be free of rocks with a maximum dimension over six inches, frozen material and other unsuitable material. That portion passing a three-inch square mesh sieve shall contain not more than 70% passing a 1/4 inch mesh sieve and not more than 10% passing a number 200 mesh sieve.

D. Rock fill shall consist of rock for use in embankments which consists of hard durable particles broken to various sizes that will form a compact embankment with a minimum of voids. It shall contain no particles or fragments with a maximum dimension in excess of the compacted thickness of the layer being placed.

E. Embankment material shall consist of suitable approved common excavation and/or common, or gravel borrow. Rock excavation may be used as embankment material if it is thoroughly mixed with common excavation and/or common borrow to eliminate voids.

PART 3 - EXECUTION

3.1 CUTTING AND REMOVAL OF EXISTING PAVEMENT

A. Refer to the Drawings for extent of cutting and removal required of existing pavements.
B. Perform all cutting in a straight and neat manner, using mechanical equipment for such purpose. Pavement cuts shall be vertical. Completely remove all cut surfacing materials from the site.
C. In addition to areas specifically designated on the Drawings, perform cutting wherever existing surfacing will be disturbed by the work of this Contract.

3.2 SAFETY

A. Comply with applicable local, state or federal safety regulations or in the absence thereof, with he provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc.
B. Provide shoring, sheeting and/or bracing at excavations as required to prevent cave-ins of excavation, and to assure complete safety of existing structures, utilities and pavements that are to remain in place.
C. Remove sheeting and shoring and bracing, as backfilling operations progress, taking all necessary precautions to prevent failure of excavation sides. Where sheeting is to be left in place, it shall not be within 2 feet of subgrade.

3.3 COMMON EXCAVATION

A. The Contractor shall excavate material encountered to establish required grade elevations.

1. Unauthorized Excavation:
    a. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.
    b. The Contractor shall backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.
2. Additional Excavation:
    a. When excavation has reached required subgrade elevations, notify the Engineer who will make an inspection of conditions.
    b. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Engineer.
    c. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work.

B. Common excavation areas shall be maintained in such condition that the excavation will be well drained.

C. Roadway excavation, in general, shall proceed in a direction upgrade. Subgrades shall be promptly rolled to prevent absorption of water.

3.4 EXCAVATION FOR UTILITY SERVICES

A. Water, telephone, fire alarm, storm drainage, electric services, utility structures, sanitary sewer piping, manholes, and catch basins will be installed under the work of the respective Sections.

3.5 MINIMUM LIMITS FOR EARTH EXCAVATION

A. Earth excavation must be carried to the following limits, unless otherwise indicated herein or on the drawings or authorized by the Engineer:
1. Subgrades for site work shall be as follows:
    a. Areas to receive topsoil - Four (4) inches below finish grades.
    b. Utility structures - Bottom of structure or as shown on the site details and eighteen (18) inches outside wall extremities.
    c. On-site bituminous concrete paved surfaces, as noted on the Drawings.
    d. Off-site paved areas, as noted on the Drawings.
    e. Unspecified site improvements - To bottom elevation of item plus ample working space on all sides.
2. In non-specified areas - To the lines indicated on the Drawings plus proper side clearance for construction.

3.6 ROCK EXCAVATION

A. In open excavations material will be classified as rock only when the following conditions prevail:
1. When the natural compound, natural mixture, and/or chemical element cannot be broken and removed from its existing position and state by a 3/4-yard backhoe or D8 dozer and requires the use of drills, or the use of explosives.
2. Boulders or old concrete foundations in excess of 2 cubic yards.
3. Anything other is "earth" insofar as removal of the material to be excavated is concerned.

4. NOTE: When during the process of excavation, rock is encountered such material shall be uncovered and exposed, and the Engineer shall be notified by the Contractor, before proceeding further. The areas in question shall then be measured as stipulated in paragraph B, following. The Contractor shall not proceed with excavation of material claimed as rock until the material has been classified by the Engineer. Should the Contractor proceed with the excavation without notifying the Engineer, or prior to the survey, he shall forfeit his right to extra payment in the subject area.

B. The Contractor will provide qualified personnel, acceptable to both the Owner and the Engineer, to take cross-sections of rock before removal of same, and to provide computations of cross-sections within the pay limits.

C. Excavate rock, encountered in grading areas within the contract, to depths as follows:
   1. Under pavements and surfaced areas - To six inches below the required subgrade for such areas.
   2. Under lawn areas - To two feet below finished grade, unless approved otherwise by the Engineer.

D. Blasting - Obtain written permission and approval of method from the local authorities before proceeding with rock excavation. Explosives shall be stored, handled, and employed in accordance with the provisions of the "Manual of Accident Prevention in Construction: of the Associated General Contractors of America, Inc.

3.7 COLD WEATHER PROTECTION

A. Protect excavations against freezing when atmospheric temperature is less than 35°F.

3.8 COMPACTION

A. General: Control soil compaction during construction to the satisfaction of the Engineer and/or Engineer-of-Record Project Representative by providing compaction to at least the minimum percentage of maximum density as specified for each area classification.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship (determined in accordance with ASTM D1557) and to not less than the following percentages of relative dry density (determined in accordance with ASTM D2049) for soils which do not exhibit a well- defined moisture density relationship.
   1. Lawn or Unpaved Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to 90 percent maximum dry density as determined by AASHTO T-180, Method C or D.
   2. Pavements: Compact top 12 inches of excavation subgrade and each layer of fill material to 95 percent maximum dry density as determined by AASHTO T-180, Method C or D.

C. Moisture Control: Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material at a rate such that free water does not appear on surface during or subsequent to compaction operations.

D. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

E. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry.

3.9 EMBANKMENT

A. Compaction Equipment:

1. Provide sufficient equipment units of suitable types to spread, level and compact fills promptly upon delivery of materials.
2. The Contractor may use any compaction equipment or device which he finds convenient or economical, but the Engineer retains the right to disapprove equipment which, in his opinion, is of inadequate capacity or unsuited to character of material being compacted.
3. The Contractor shall be responsible for the proper placement and compaction of backfill material. Any settlement that occurs shall be repaired by the Contractor at his own cost and expense. If pipeline and/or structures are damaged or displaced, they shall be repaired at the Contractor's expense.

B. Areas to be filled or backfilled shall be free of construction debris, refuse, compressible or decayable materials and standing water.
C. Notify the Engineer when excavations are ready for inspection. Filling and backfilling shall not be started until conditions have been approved by the Engineer.
D. Place acceptable soil materials in layers to required subgrade elevations, for each area classification listed below.
   1. In excavations; use satisfactory excavated or borrow material.
   2. Under grassed areas; use satisfactory excavated or borrow material.
   3. Under pavements; use satisfactory excavated or borrow material or combination of both.
E. Grub areas a depth of 12" where fills are to be less than five feet in depth as shown on the Drawings.
F. When existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
G. Placement and Compaction: Place fill materials in layers no thicker than 10 inches.
H. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification.
I. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
J. Place backfill and fill materials evenly to required elevations adjacent to structures. Take care to prevent wedging action of fill against structures by carrying the material uniformly around structure to approximately the same elevation in each lift.
K. When water and sewer piping is laid in filled areas, place the fill before any pipe is placed, and compact as specified to a depth or not more than two feet above the proposed top of the pipe. A trench shall then be excavated to the required grade, and of sufficient width to permit thorough tamping of the fill under the bells and around the pipe.
L. At the end of each day’s work the embankment shall be shaped and rolled to minimize infiltration of water.

3.10 GRADING

A. General: Uniformly grade areas within limits of construction. Smooth finished surface within specified tolerances.
   1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 feet above or below the 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 the required subgrade elevation.

3.11 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
B. Repair and re-establish grades to specified tolerances in settled, eroded or rutted areas.
C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, reshape, and compact to required density prior to further construction.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, debris and dispose of it off the Owner's property. This provision does not apply to stockpiled topsoil which shall remain on site unless written authorization for its removal is provided by the Engineer.

END OF DIVISION 312000

SECTION 312213 - ROUGH GRADING

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Removal of topsoil and subsoil.
- B. Cutting, grading, filling and rough contouring the site.

1.2 RELATED SECTIONS
- A. Section 312300 – Excavation (Excavation and Fill)
- B. Section 312316.13 – Trenching
- C. Section 312333 – Trench Backfilling, Compaction, Control & Testing

1.3 REFERENCES
- A. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ASTM D922 - Test Method for Density of Soil and Soil Aggregate in Place by the Nuclear Methods. (Shallow Depth)
- C. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

PART 2 - PRODUCTS

2.1 MATERIALS
- A. Topsoil: Excavated material, graded, free of roots, rocks larger than 1 inch, subsoil, debris, and large weeds.
- B. Subsoil: Excavated material, graded, free of lumps larger than 6 inches, rocks larger than 3, and debris.

PART 3 - EXECUTION

3.1 EXAMINATION
- A. Verify site conditions.
- B. Verify that survey benchmark and intended elevations for the Work are as indicated.

3.2 PREPARATION
- A. Identify required lines, levels, contours, and datum.
- B. Identify known underground, above ground, and aerial utilities. Stake and flag locations.
- C. Protect above and below grade utilities which are to remain.
- D. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- E. Protect bench marks and existing structures from excavation equipment and vehicular traffic.

3.3 TOPSOIL EXCAVATION
- A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Remove from site.

3.4 SUBSOIL EXCAVATION
- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.

B. Remove from site or use in approved locations.
C. When excavation through roots is necessary, perform work by hand and cut roots with sharp axe.

3.5 FILLING

A. Fill areas to contours and elevations with unfrozen materials.
B. Common Borrow MDOT 703.18: Place and compact materials in continuous layers not exceeding 8 inches of compacted depth, compacted to 95 percent.
C. Maintain optimum moisture content of fill materials to attain required compaction density.
D. Make grade changes gradual. Blend slope into level areas.

3.6 TOLERANCES

A. Top Surface of Subgrade: Plus or minus $1/10^{th}$ foot.

END OF DIVISION 312213

DIVISION 312300 - EXCAVATION (EXCAVATION AND FILL)

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Excavation for foundations.
B. Excavation for slabs-on-grade.
C. Excavation for site structures.

1.2 RELATED SECTIONS

A. Section 312213 - Rough Grading
B. Section 312333 – Trench Backfilling, Compaction, Control & Testing
C. Section 312316.13 - Trenching

1.3 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the Work are as indicated.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Identify known underground, above ground, and aerial utilities. Stake and flag locations.
C. Protect above and below grade utilities which are to remain.
D. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
E. Protect benchmarks, existing structures, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

3.2 EXCAVATION

A. Excavate subsoil required to accommodate building foundations and slabs-on-grade.
B. Grade top perimeter of excavation to prevent surface water from draining into excavation.
C. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
D. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
E. Correct unauthorized excavation at no extra cost to Owner.
F. Remove excess material not being reused from site.

3.3 FIELD QUALITY CONTROL

A. Provide for visual inspection of bearing surfaces.

3.4 PROTECTION

A. Protect excavations by methods required preventing cave-in or loose soil from falling into excavation.
B. Protect bottom of excavations and soil adjacent to and beneath foundation, from freezing.

END OF DIVISION 312300

DIVISION 312316 - ROCK REMOVAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

Furnish the labor, materials and equipment necessary to identify and remove bedrock within the proposed excavation limits in accordance with the requirements of this Section, including the following:

A. Rock Removal - All rock blasting and rock removal using drill and blast techniques, including blasting for roadways, parking areas, building foundations, and trench blasting for utilities. The blasting shall be performed in accordance with the requirements of this Section. The Contractor shall employ controlled blasting procedures in order to maintain ground vibrations and airblast overpressures below the maximum levels specified in this Section and to minimize stressing and fracturing of the rock beyond the limits of the excavations, footing elevation subgrades, and utility trenches shown on the Drawings. The Contractor's proposed blasting methods, procedures, sequence and data to show compliance with these specifications shall be described in a blasting plan submitted prior to blasting operations and meeting the requirements of subsection 3.02.
   1. Condition Surveys - The Contractor shall perform pre-blast condition surveys of all structures and improvements of adjoining properties within at least 600 feet of any blast as described in subsection 3.01.A. If a complaint of alleged blasting related damage is made by a nearby property owner during construction, the Contractor shall perform additional condition surveys as described in subsection 3.01.B.
   2. Test Blasts - Prior to commencement of production blasting, the Contractor shall, using small charges and the required monitoring instruments, establish a site specific relationship between charge weight, distance and response in accordance with the requirements of subsection 3.04.F.2.
   3. Blast Monitoring - A monitoring program of blasting vibrations shall be performed by the Contractor during construction in accordance with the requirements of subsections 1.06.C.3 and 3.07.
   4. Blasting Records - A blasting log summarizing the details of the round as shot, weather conditions, blast proximity to nearby structures, location of monitoring instruments and measured vibration data shall be maintained and reported in accordance with the requirements of subsections 1.06.C.2 and 3.06.

B. Disposal of blasted rock and cleaning of exposed bedrock surfaces.

1.2 RELATED SECTIONS AND INFORMATION

A. Section 312213 - Rough Grading
B. Section 312000 - Earthwork
C. Section 312333 – Trench Backfilling, Compaction, Control & Testing: Backfill materials.
D. Section 312316.13 - Trenching: Trenching and backfilling for utilities.

1.3 PRICES

A. Rock Quantity: Rock removal, including open ledge and trench ledge will be priced on a unit price basis.

1.4 COMPLIANCE WITH STANDARDS

A. Comply with the provisions of all applicable safety codes including without limitation the following Codes and Standards:
B. National Fire Protection Association (NFPA): 495 Code for the Manufacture, Transportation, Storage and Use of Explosive Materials.
C. "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc.
D. "Construction Safety Rules and Regulations" as adopted by the State Board of Construction Safety, Augusta, Maine.
E. Section 107.12 (Use of Explosives) of the "Standard Specifications" prepared by the Maine Engineering Firm of Record of Transportation.
F. Occupational Safety and Health Act of 1970 (Public Law 91-596 of the United States, 29 USC Section 651 et. seq.)
G. Applicable provisions of laws, rules, ordinances, and regulations of Federal, State and the Town of Farmingdale governing the transportation, storage, handling and use of explosives.
I. In case of conflict between regulations or between regulations and the requirements of this Specification, the Contractor shall comply with the strictest applicable codes, regulations or Specifications.

1.5 DEFINITIONS

A. Site Rock: Solid mineral material with a volume in excess of 1/3 cu yd. loose rock removable by hammer or over excavation shall not be designated as site rock.
B. Trench Rock: Solid mineral material with a volume in excess of 1/4 cu yd or solid material that cannot be removed with a backhoe without drilling or blasting. Rock removable by hammer shall not be designated as trench rock.
C. Peak Particle Velocity: Peak Particle Velocity shall mean the greatest of three peak velocity components (inches per second units) measured at any point, with the three components being measured in the vertical and mutually perpendicular horizontal directions.

1.6 SUBMITTALS AND NOTIFICATIONS

A. Submit under provisions of section 01300.
B. Advance Submittals and Notifications
   1. Qualifications: Qualifications in accordance with the provisions of Section 1.07 shall be submitted for the blasting contractor conducting blasting operations and for the independent seismologist or blasting consultant performing pre-blast surveys and vibration monitoring.
      a. Blasting Contractor - At least two weeks prior to commencing drilling and blasting operations written evidence of the licensing, experience, and qualifications of the blaster who shall be responsible for the loading and firing of each shot shall be submitted to the Engineer. If different, the name and qualifications of the person responsible for designing and directing the blasting operation shall also be submitted to the Engineer.
      b. Seismologist or Blasting Consultant - At least two weeks prior to the performance of pre-blast surveys the name and resume of qualifications of the independent seismologist or blasting consultant proposed for use in conducting pre-blast condition surveys and monitoring blast vibrations shall be submitted to the Engineer. In the event a different seismologist or blasting consultant is proposed for use in monitoring blast vibrations only, the name and resume of qualifications of this individual shall be

submitted to the Engineer at least two weeks prior to commencing any drilling and blasting operations. A sample of a previous vibration analysis or report shall be included with the qualifications.

2. Notification of Pre-Blast Surveys and Blasting Schedule: Prior to commencement of any pre-blast surveys, the Contractor shall provide documentation to the Engineer and the Town listing building owners within 600 ft. of the anticipated blasting areas (from Tax Map records), that the subject building owners were notified of the pre-blast survey work and the blasting schedule, and the offer to conduct a pre-blast survey was either accepted or rejected by each building owner.
3. Pre-Blast Condition Surveys: Written verification that all pre-blast condition surveys and related reports were completed in accordance with the requirements of Section 3.01 shall be submitted to the Engineer at least two weeks prior to commencing any drilling and blasting operations.
4. Blasting Plan: At least two weeks prior to commencing drilling and blasting operations the Contractor shall submit to the Engineer for review a blasting plan providing complete details of his proposed blasting and construction operations in accordance with the blasting plan requirements described in Section 3.02.
5. Blasting Schedule: The blasting contractor shall prepare and submit a blasting schedule in accordance with the requirements of Section 3.03 to the Engineer and the Town (fire, police, emergency agencies and Codes Enforcement personnel) at least one week prior to commencing blasting operations.
6. Certificate of Insurance: Prior to commencing any drilling and blasting operations, the Contractor shall submit a Certificate of Insurance in accordance with the requirements of Section 1.10.

C. Submittals and Notifications During Blasting Operations

1. Notification of Individual Blasts: During construction the blasting contractor shall coordinate the blasting schedule with the Engineer and the Town (fire, police, emergency agencies and Code Enforcement personnel) when requested. A minimum of 24 hours in advance, the blasting contractor will notify the Engineer and the Town by telephone of the start of blasting in any new area. At least 24 hours prior to any blast, the blasting contractor shall inform by telephone all property owners who have requested to be so informed, of the impending blast.
2. Blasting Log: A blasting log summarizing details of the round as shot, weather conditions, proximity of the blast location to nearest structures, exact locations of monitoring instruments, and the results of blast monitoring at each instrument location shall be maintained daily for every blast. Specific information to be included on the log are described in Section 3.06. The blasting log shall be available for inspection on-site, shall be submitted in writing to the Engineer within 24 hours following each blast, and shall be submitted to the Town on a weekly basis.
3. Blast Monitoring Reports: Blast monitoring data obtained by the independent seismologist or blasting consultant shall be available for inspection on-site, shall be submitted in writing to the Engineer (as part of the blasting log) within 24 hours following each blast, and shall be submitted to the Town on a weekly basis. In the event a ground vibration or airblast limit is exceeded, the blasting contractor shall notify the Engineer by telephone immediately following the blast.

4. Condition Surveys: If a nearby property owner submits a complaint regarding alleged blasting related damages during construction, the independent seismologist or blasting consultant shall conduct a second survey of the property within 48 hours of receiving the complaint to identify any changes in the property conditions. A condition report summary shall be submitted to the Engineer within two weeks after the second survey is conducted.
5. Noise Minimization: The contractor shall take precautions, such as the use of water, vacuums, and mufflers, to minimize noise and dust from air track operations, and shall keep noise and airborne dust levels at off site residences below regulatory limits.

1.7 QUALIFICATIONS

A. The Blasting Contractor shall be a company specializing in explosives for disintegration of rock, with at least five years documented experience in controlled blasting techniques.
B. Seismologist or Blasting Consultant: The Contractor will be required to retain an independent seismologist or blasting consultant to perform condition surveys prior to and during blasting operations, and to monitor, record, analyze, and report the seismic vibrations and airblast pressures being caused by blasting activities.
The seismologist or blasting consultant shall have at least five years of documented experience conducting condition surveys for blasting operations, and shall be experienced in the subject of vibrations emanating from construction activities. The seismologist or blasting consultant shall not be an employee of the Contractor, subcontractor, explosives manufacturer, or explosives distributor.
C. The seismologist or blasting consultant shall be present at the site of the blasting during all blasts. The seismologist or blasting consultant shall provide and use all necessary equipment to observe and record vibrations to ascertain that acceptable levels of vibrations are not exceeded. The seismologist or blasting consultant shall monitor, report findings, and submit recommendations to the Engineer in accordance with the requirements of this Specification.

1.8 REGULATORY REQUIREMENTS

A. Conform to applicable code for explosive disintegration of rock and to NFPA 495 for handling explosive materials.
B. Obtain permits from authorities having jurisdiction before explosives are brought to site or drilling is started.

1.9 SAFETY PRECAUTIONS AND WARNING SIGNALS

A. During the blasting operation the blasting contractor shall be responsible for control of access in and around the general blast area.
B. All persons within 600 ft. of the blasting area will be notified of “warning” and “all-clear” signals through notices left in mailboxes and signs posted in the area.
C. Equipment and traffic shall be stopped far enough away to ensure work area safety and shall not be released until the blasting foreman issues the “all-clear” signal.
D. A series of air horn warnings shall be issued to warn of an imminent blast as follows: 3 horn signals at 5 minutes prior to blast; 2 horn signals at 1 minute prior to blast: 1 horn signal after the blast to signal “all-clear” conditions once the shot has been checked for any misfires.
E. Explosives shall be stored, handled and employed in accordance with federal, state and local regulations and in accordance with NFPA 495, except where stricter requirements are contained elsewhere herein such requirements shall govern.

F. No explosives, caps, detonators, and fuses shall be stored on the site during non-working hours. The Contractor shall notify each public utility company having structures in the proximity to the work site, of the impending use of explosives and give sufficient advance notice to enable the companies to take such steps as they deem necessary to protect their property from injury.

1.10 RESPONSIBILITY FOR BLASTING OPERATIONS

A. A review of the Contractor's blasting submittals by the Engineer or the Town will not relieve the Contractor of its responsibility for the accuracy, adequacy, and safety of the blasting; for exercising proper supervision and field judgment; for preventing damage to structures; and for producing results in accordance with this Specification and the regulations and ordinances of the Town of Farmingdale. The Contractor shall be solely and completely responsible for the safety of all persons and property during the performance of its work. The Contractor shall take whatever measures it deems necessary, in addition to the requirements herein, to protect the safety of persons and property, both at the construction site and away from the site. The Contractor shall have full and complete responsibility for the handling, discharging, or settling of any and all damage or annoyance claims resulting from the blasting activities on the project. Any monitoring and/or review of the Contractor's procedures and performance conducted by the Engineer or the Town shall not relieve the Contractor of its responsibility for safety at and away from the site, or for preventing damage to adjacent structures or property. The Blasting Contractor shall carry liability insurance coverage (XCU) in an amount no less than $2,000,000. A certificate of insurance documenting the coverage and naming the owner, owner's representative, Engineer, and their consultants as additional insured shall be submitted prior to commencing any drilling and blasting operations.

1.11 INDEMNITY

A. The Contractor shall hold harmless the Owner, Owner's representative, Engineer and their consultants from any costs, liens, charges, claims or suits, including the costs of defense arising from any direct or indirect damage, real or alleged, from blasting.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Explosives: Type recommended by explosive firm following seismic survey and required by authorities having jurisdiction.
B. Delay Device: Type recommended by explosive firm.
C. Blast Mat Materials: Type recommended by explosives firm.

PART 3 - EXECUTION

3.1 CONDITION SURVEYS

A. Pre-Blast Condition Surveys: The pre-blast survey shall document the conditions of existing buildings within at least 600 ft. of the limit of blasting work. The pre-blast survey shall be completed by the independent seismologist or blasting consultant. The survey shall include documentation of interior subgrade and above grade accessible walls, ceilings, floors, roof, and visible exterior as viewed from the grade level. It shall detail the existing structural, cosmetic, plumbing, and electrical condition, and shall include all walls, and not be limited to areas in buildings showing existing damage. Where significant cracks or damage exist, or for defects too complicated to describe in words, photographs shall be taken.

A good quality videotape survey with appropriate audio description of locations, conditions, and defects can be used. Notes and sketches may be made to highlight or enhance the photographic documentation. The condition report shall present engineering notes and photographs or video records. The report shall also summarize the condition of each building and define areas of concern, including deteriorated structures or utilities, structures housing sensitive equipment, and/or manufacturing processes that are sensitive to vibrations.

B. Condition Surveys During Construction: If a nearby property owner submits a complaint regarding alleged blasting related damages during construction, the independent seismologist or blasting consultant shall conduct a second condition survey of the property within 48 hours of receiving the complaint to identify any changes in the property conditions. This survey shall be conducted with same level of detail, care and diligence as the pre-blast condition survey.

C. The contractor shall report to the Town in writing all blasting complaints received by the contractor within 24 hours of receipt. Each blast complaint report shall include the name and address of the complaintant, time received, date and time of blast complained about, and a written description of the circumstances, which led to the complaint. Upon receiving a written complaint from a Engineer-of-Record alleging damage from blasting, the contractor's independent seismologist or blasting consultant and/or a representative of the Blaster's Insurance Company shall investigate the claim and a written report shall be issued to the homeowner, with a copy to the Town, of the results of the investigation and the response of the contractor. This written report shall be received by the Engineer-of-Record and the Town within 15 working days of receipt of the written complaint.

3.02 BLASTING PLAN

A. The blasting contractor shall be required to submit a drilling pattern and loading plan, referred herein as a blasting plan, in accordance with the schedule described in Section 1.06.B.4. The blasting plan shall be submitted to the Engineer for review, and shall contain details of the proposed rock excavation and blasting operations. No drilling or blasting shall take place until approval is received from the Engineer. The blasting plan shall include the following:

1. The sequence and schedule of blasting rounds, including the general approach for developing each bedrock excavation area.
2. A diagrammatic description of the typical blast pattern to be used, including presplitting pattern if pre-splitting is required.
3. Diameter, spacing, burden, depth and orientation of each drill hole relative to the "free face", along with details of the delay pattern.
4. A diagrammatic description of the loading plan for a typical production hole and, if presplitting is required on the project, for a typical presplit hole. This description shall include:
    a. Diameter, spacing, burden depth and orientation of each drill hole.
    b. Type and nomenclature of detonators and delay pattern.
    c. Type, nomenclature and weight per cartridge of explosives to be used, and weight and distribution of charge to be used within each hole, as well as total weight of explosive charge on each delay, and the total weight for the blast round.
    d. Type and distribution of stemming to be used in each hole
5. Estimation of ground vibration levels at nearest adjacent structures.
6. Methods of matting the blast area to prevent fly rock and excessive air blast pressure.
7. Written evidence of the licensing, experience, and qualifications of the blaster who will be directly responsible for the loading and firing of each shot.

8. A listing of instrumentation which the Contractor and/or the independent seismologist or blasting consultant proposes to use to monitor vibrations and, together with performance specifications and users manual supplied by the manufactures, and a recent calibration (within the previous six months).
9. A description of the criteria to be used for locating vibration-monitoring instrumentation for each blast.
10. A copy of the blasting permit obtained to conduct blasting on the site.

B. The blasting plan shall form the basis for all blasting operations on the project. If, in the judgment of either the Engineer or the Contractor, changes in the plan appear to be necessary, drilling or blasting operations shall be suspended and a revised plan shall be submitted to the Engineer reflecting the proposed changes.

3.3 BLASTING SCHEDULE

A. The blasting contractor shall prepare and submit a projected project-blasting schedule to the Engineer and the Town (fire, police, emergency agencies and Codes Enforcement personnel) at least one week prior to commencing blasting operations. The schedule shall, at a minimum, include the following:
1. Name, address and phone number of blaster.
2. Identification of specific basting areas.
3. Projected dates and times of blasts.
4. Methods to restrict access in the blast area and warning whistle announcements.

B. During construction the blasting contractor shall coordinate the actual blasting schedule with the Engineer and the Town (fire, police, emergency agencies and Codes Enforcement personnel) when requested. A minimum of 24 hours in advance, the blasting contractor shall notify by telephone the Engineer and, if requested, the Town, of the estimated time of blast. At least 24 hours prior to any blast, the blasting contractor shall inform by telephone all property owners who have requested to be so informed, of the impending blast.

3.4 EXCAVATION METHODS

A. General: Rock excavation shall be accomplished by blasting, cutting, wedging, barring, hammering, mechanical ripping, or a combination thereof. The Contractor shall select and be responsible for methods and procedures to be used, except as hereinafter provided.

B. Scaling and Final Rock Slope Stability: Rock scaling may be required on all or part of the exposed face following rock excavation. All loose and unstable material, all breakage, and all potentially unstable rock slides, even if located beyond the payment lines, shall be removed or stabilized to the Engineer's satisfaction during or upon completion of the excavation. Permanent rock cut slopes deviating from the design grades or exhibiting unexpected conditions shall be inspected by the Engineer, or their qualified geotechnical engineering sub-consultant, concerning the long-term stability of the slopes. The Engineer, or their sub-consultant shall prepare written documentation, and copied to the Town, regarding the long-term stability of the rock cut slopes, including, if appropriate, any remedial actions considered necessary to provide slopes with a suitable factor of safety against post-construction movements.

C. Rock Excavation Limits and Overblast Mitigation: All necessary precautions shall be taken in blasting operations to preserve the rock outside the lines of excavation in the soundest possible

condition. Blasting shall be done only to the lines and grades shown on the Drawings or approved by the Engineer. Where overblasting occurs at footing locations or other project structures, the overblasted rock shall be completely removed to the satisfaction of the Engineer, and the over-excavated area backfilled with 2500 psi concrete, crushed stone, or in accordance with backfilling and compaction requirements of Section 02223 as determined by the Engineer.

D. Excavations for Buried Utilities: In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

E. Cleaning of Rock Surfaces: The Contractor shall, in areas designated by the Engineer, clean rock surfaces exposed during excavation to permit a thorough inspection and assessment of the rock by the Engineer. Cleaning of rock surfaces shall consist of the removal of all organic materials, soil, and loose rock. Cleaning may be done with high-pressure air jets, water jets, brooms or by any other method acceptable to the Engineer.

F. Blasting Procedures:

1. Hours of Blasting: Blasting shall be limited to the hours of 9:00 AM and 4:00 PM, Monday through Friday.
2. Test Blast(s): Prior to the commencement of production blasting, the Contractor shall, using small charges and the required monitoring instruments, establish a site specific relationship between charge weight, distance and response. The Contractor shall develop site specific scaled distance relationships from the test blast rounds to determine the allowable charge weight of explosives to be detonated per delay which will result in a minimum of overbreak, a minimum of shattering or loosening of rock beyond the excavation limits, and which will produce sound and reasonably uniform surfaces in the completed excavations.. The scaled distance (D_s) shall be the distance from the charge to the recording seismograph (D), divide by the square root of the explosive charge ($W^{0.5}$).
3. Controlled Perimeter Blasting: When blasting near existing structures, production blasting shall start as far as possible from the existing structures so that blast vibrations and bedrock conditions can be evaluated as blasting approaches the structures. For blasting located within 65 ft. of existing structures, controlled perimeter blasting techniques may be required along the excavation perimeter to assist in obtaining a stable, undisturbed rock face and mitigate offsite impacts. Controlled blasting refers to the controlled use of explosives and blasting accessories in carefully spaced and aligned drill holes, to produce a smooth, free surface, or shear plane, in the rock along the specified backslope. Acceptable controlled blasting techniques include presplitting, cushion blasting, line drilling, and smooth-wall blasting. Smaller blast rounds may also be desirable as blasting approaches nearby structures to minimize explosive charge weights and mitigate impacts in the event normally sized charges do not produce expected results.
4. Fly Rock Control: Before the firing of any blast, the rock to be blasted shall be covered with blasting mats, as approved by the Engineer. Mats shall be placed for every blast over the entire loaded area and shall restrict all fly rock from leaving the site. If blasted rock is permitted to escape the blasting mats, all blast-related activities shall be stopped. The Contractor shall prepare a report describing why rock was allowed to be ejected, and how such events will be prevented in the future. This report shall be submitted to the Engineer and, if requested, the Town. In order to proceed with any further blast related activity, written permission shall be obtained from the engineer. These provisions do not relieve the Contractor from all responsibility for the safety of his own personnel, the safety of the general public, as well as damage to structures.

5. Overbreak Control at Perimeter Areas: When blasting at the perimeter of the excavations, care shall be taken at the excavation limits to minimize overbreak and fracturing of remaining rock. If necessary, presplitting or cushion blasting shall be utilized at such locations.
6. No free-flowing, pourable, or pumpable explosives shall be used. All explosives shall be in cartridges or other semi-rigid containers.

3.5 VIBRATION AND AIRBLAST LIMITS

A. Ground Vibration: Ground vibration from all blasting operations shall be measured in terms peak particle velocity (inches per second), any of the three mutually perpendicular components of particle velocity, and frequency (Hertz).

1. Residential Structures: The permissible maximum ground vibration at existing nearby aboveground structures shall not exceed the following limits:

Ground Vibration Limits for residential structures

Type of Structure	*Maximum PPV (in/s)*	
	Frequencies Below 40 HZ	*Frequencies 40Hz or Greater*
Modern Homes – Drywall Interiors	0.75	2.0
Older Homes – Plaster on Wood Lath for Interior Walls	0.50	2.0

2. Non-Residential Structures: The maximum peak particle velocity (PPV) of ground vibrations for non-residential structures shall not exceed 2.0 in/s.
3. Underground Utilities: The maximum PPV of ground vibrations for underground utilities shall not exceed 2.0 in/s. Buried pipelines and other utilities owned by private utility companies are sometimes subject to lower limiting values imposed by the owner. The Contractor shall verify the maximum allowable PPV of ground vibrations allowed by the individual utilities.
4. Deteriorated structures or utilities, structures housing sensitive equipment, and/or manufacturing processes that are sensitive to vibrations may require lower PPV limits than those indicated above. If information obtained from the pre-blast surveys indicates lower limits are required at certain structures, the independent seismologist or blasting consultant will identify the lower limits applicable to a specific structure, and the blasting contractor shall incorporate such provisions in the features of the blasting plan applicable to this site area.

B. Airblast Overpressure: The peak airblast overpressure at any inhabited building not owned or controlled by the developer will not be allowed to exceed 133 decibels (linear) when measured by an instrument with a high pass system and a lower frequency limit of 2 Hz. The equivalent maximum allowable airblast overpressure is 0.013 pounds per square inch (psi).

C. Vibration Reduction: In the event the blasting contractor's blasting round results in ground vibrations or airblast overpressures approaching the stated limits, the Engineer may require the blasting contractor to modify the blasting operations to reduce ground vibrations/overpressures. In the event the blasting contractor's blasting round results in ground vibrations or airblast overpressures exceeding the stated limits at structures, the blasting contractor shall cease all blasting activities and submit a written report to the Engineer, and copied to the Town. This report shall discuss the corrective action to be taken on the next shot, and the next shot shall not be loaded until the Engineer acknowledges, in writing, that a design change is being attempted

3.6 BLASTING RECORDS

A. A blasting log summarizing details of every blast round as shot shall be maintained daily. The blasting log shall include detailed information concerning the specific drilling and loading for each blast as well as the results of blast monitoring by the independent seismologist or blasting consultant. Blast monitoring requirements are described in Section 3.07. The blasting log must be available for inspection on-site, shall be submitted in writing to the Engineer within 24 hours following each blast, and shall be submitted to the Town on a weekly basis. Specific information to be included on the log include:

1. Name of blasting company and blaster responsible for the blast.
2. Location, date and time of the blast.
3. Weather conditions including such factors as wind direction and cloud cover.
4. Number and spacing of drill holes and depth of burden or stemming.
5. Diameter and depth of drill holes.
6. Type of explosives used.
7. Total amount of explosives used.
8. Maximum amount of explosives used per delay period of 8 milliseconds or greater.
9. Maximum number of holes per delay period of 8 milliseconds or greater.
10. Method of firing and type of circuit.
11. Type of detonators used and delay periods used.
12. Height or length of stemming.
13. Distance and direction to nearest structure.
14. Scale distance to nearest structure.
15. The exact location and approximate elevation of each seismograph and the distance from each seismograph to the blast.
16. Vibration and airblast overpressure data from each seismograph, including a strip chart (or other permanent record of velocity/time waveform) with the calibration and monitoring record marked with the date, time and location of the blast, including: resultant PPV (in/s); longitudinal, vertical and transverse PPV (in/s); frequency (Hz); and peak airblast overpressure (dBL).
17. The name and signature of the person operating each seismograph.
18. The name of the person and firm analyzing the seismograph record.

3.7 BLAST MONITORING

A. Blast monitoring and analysis shall be conducted by the independent seismologist or blasting consultant. A minimum of three (3) seismograph instruments shall be used to monitor vibrations and

airblast overpressures for each blast. Seismograph locations for each blast shall comply with the criteria described in the blasting plan.

B. All vibration-monitoring instruments used on the project shall comply with the following requirements:
   1. Measure, display, and provide a permanent record on a strip chart of particle velocity components.
   2. Measure the three mutually perpendicular components of particle velocity in directions vertical, radial, and perpendicular to the vibration source.
   3. Have a velocity (seismic) frequency response of 2 Hz to 150 Hz, a sound frequency range of 1 Hz to 500 Hz, and be capable of measuring PPV's up to 10 in/s.
   4. All seismographs used on the project shall display the date of the most recent calibration.
   5. Calibration must have been performed within the last six (6) months and must be performed to a standard traceable to the National Institute of Standards and Technology.

C. Blast monitoring data obtained by the independent seismologist or blasting consultant shall be available for inspection on-site, shall be submitted in writing to the Engineer as part of the blasting log (Section 3.06) within 24 hours following each blast, and shall be submitted to the Town on a weekly basis. In the event a ground vibration or airblast limit is exceeded, the blasting contractor shall notify the Engineer by telephone immediately following the blast.

END OF DIVISION 312316

DIVISION 312316.13 - TRENCHING

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Excavate trenches for piping.
- B. Backfilling and compaction.

1.2 RELATED SECTIONS
- A. Section 312333 – Trench Backfilling, Compaction, Control & Testing

1.3 REFERENCES
- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 kg) Rammer and 12 inch (304.8 mm) Drop.
- C. ASTM D922 - Test Method for Density of Soil and Soil Aggregate in Place by the Nuclear Methods. (Shallow Depth)
- D. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

1.4 FIELD MEASUREMENTS
- A. Verify that intended elevations for the Work are as shown on Drawings.

PART 2 - PRODUCTS

2.1 BED MATERIALS
- A. Type 1 - 3/4 inch screened stone; free of shale, clay, friable material, sand, debris; graded in accordance with ANSI/ASTM C136.
- B. Dead Sand.

PART 3 - EXECUTION

3.1 EXAMINATION
- A. Verify fill materials to be reused, is acceptable.

3.2 PREPARATION
- A. Identify required lines, levels, contours, and datum.
- B. Maintain and protect existing utilities remaining, which pass through work area.
- C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- D. Protect benchmarks and existing structures from excavation equipment and vehicular traffic.
- E. Protect above and below grade utilities which are to remain.
- F. Cut out soft areas of subgrade not capable of insitu compaction.

3.3 EXCAVATION
- A. Cut trenches sufficiently wide to enable installation of drainage structures and allow inspection.
- B. Hand trim excavation. Remove loose matter.
- C. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
- D. Correct unauthorized excavation at no cost to Owner.

E. Remove excavated material from site.

3.4 BEDDING

A. Support drainage structures during placement and compaction of bedding fill.

3.5 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen materials.
B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
C. Employ a placement method that does not disturb or damage the pipe in trench.
D. Maintain optimum moisture content of backfill materials to attain required compaction density.
E. Remove surplus backfill materials from site.

3.6 TOLERANCES

A. Top Surface of Backfilling: Plus or minus 1/2 inch from required elevations.

3.7 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with ANSI/ASTM D1556, ANSI/ASTM D1557, and ANSI/ASTM D698.
B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.8 PROTECTION OF FINISHED WORK

A. Re-compact fills subjected to vehicular traffic.

END OF DIVISION 312316.13

SECTION 312323 - STRUCTURE BACKFILLING (FILL)

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Building perimeter construction, backfilling and site structure backfilling.
- B. Fill under slabs-on-grade.
- C. Consolidation and compaction.

1.2 RELATED SECTIONS
- A. Section 312000 - Earthwork.
- B. Section 03300 - Cast-in-Place Concrete: Concrete materials.

1.3 REFERENCES
- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 kg) Rammer and 12 inch (304.8 mm) Drop.
- C. ASTM D922 - Test Method for Density of Soil and Soil Aggregate in Place by the Nuclear Methods. (Shallow Depth)
- D. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

PART 2 - PRODUCTS

2.1 FILL MATERIAL
- A. Granular Borrow: MDOT 703.19: Place and compact materials in continuous layers not exceeding 8 inches of compacted depth, compacted to 95 percent of modified proctor density.
- B. Reference Sheet C001 Construction Notes for Fill Material Specifications

PART 3 - EXECUTION

3.1 EXAMINATION
- A. Verify fill materials to be reused are acceptable.
- B. Verify foundation perimeter drainage installation has been inspected.

3.2 PREPARATION
- A. Generally, compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of insitu compaction. Fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.3 BACKFILLING
- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Employ a placement method that does not disturb or damage foundation perimeter drainage, foundation damp proofing, and utilities in trenches.

3.4 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with ANSI/ASTM D1556, ANSI/ASTM D1557, and ANSI/ASTM D698.
B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.5 PROTECTION OF FINISHED WORK

A. Recompact fills subjected to disturbance.

END OF DIVISION 312323

DIVISION 312333 - TRENCH BACKFILLING, COMPACTION, CONTROL & TESTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Backfilling work includes backfilling trenches below subgrade and/or backfilling around structures with suitable material removed in the course of excavating and other suitable material as shown on the Drawings and/or as specified herein.

B. Related Work Specified Elsewhere: (When Applicable)
   1. Traffic regulation is specified in Division l.
   2. Clearing, removal and replacement of paving, trench excavation-earth, trench excavation - ledge, structure excavation, dewatering, borrow and bedding material are specified in the appropriate sections in this division.
   3. Quality Control as specified in Division 1.

1.2 QUALITY ASSURANCE

A. When other than excavated backfill is required, and/or where shown on the Drawings, compact backfill material to an in-place density not less than 90 percent of the maximum density of the material in accordance with ASTM Dl557 Method "B".

B. Where backfilling with excavated material, compact to native field density.

C. Density testing shall be performed by an Independent Testing Laboratory retained by the Owner.

D. Determine in-place density in accordance with ASTM Dl556 or by other methods as approved by the Engineer.

E. Locations of Tests (when applicable):
   1. Average of one test between each manhole for sewers.
   2. Average of two tests around each pump station structure.
   3. Average of one test for each 300 linear feet of water line and of force main.
   4. Additional testing will be required by the Engineer if the Engineer is not satisfied with the apparent results of the contractor's compaction operation.
      a. If the additional test results fail to meet the requirements of these Specifications, the Contractor shall undertake whatever action is necessary, at no additional cost to the Owner, to obtain the required compaction. Owner will pay the cost of retesting. The Engineer will determine the cost of retesting and the Owner will invoice the Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price. No allowance will be considered for delays in the performance of the work. The Independent Testing Laboratory shall conduct all testing and retesting.
      b. If the test results pass and meet the requirements of these Specifications, the cost of the testing service will be borne by the Owner, but no allowance will be considered for delays in the performance of the work.

F. Requirements for compaction and the testing thereof establish guidelines for proper backfilling, but in no way relieve Contractor of correcting any settlement, which occurs thereafter.

PART 2 - PRODUCTS

2.1 FINAL BACKFILL MATERIALS

A. Suitable Excavated Material:
   1. Free from large clods, silt lumps or balls of clay.
   2. Free from stones and rock fragments over 50 pounds.
   3. Free from organics, peat, etc.
B. Frozen Materials:
   1. Do not backfill with, or on, frozen materials.
   2. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.
C. Wet Material:
   1. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet.
   2. Do not continue backfilling until the previously placed and new materials have dried sufficiently to permit proper compaction.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:
   1. Provide and place all necessary backfill material.
   2. Do not allow large masses of backfill material to be dropped into the excavation, as from a grab bucket, in such a manner that may endanger pipes and structures.
   3. Place material in a manner that will prevent stones and lumps from becoming nested.
   4. Completely fill all voids between stones with fine material.
   5. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.
   6. Deposit backfill material evenly on all sides of structures to avoid unequal soil pressures.
   7. Keep stones or rock fragments with a dimension greater than two inches at least 6 inches away from the pipe or 18 inches from the structure during backfilling.
B. Sheeting:
   1. Leave sheeting in place when, in the opinion of the Engineer, damage is likely to result from its withdrawal.
   2. Completely fill with suitable material and thoroughly compact all voids left by the removal of sheeting.
C. Backfilling in Paved Areas:
   1. Backfill in such a manner as to permit the rolling and compaction of the backfilled trench with the adjoining material to provide the required subgrade bearing value for placing aggregate base and subbase materials and paving immediately after backfilling is completed.
   2. Where required, place excavated material that is acceptable to the Engineer for surfacing or pavement subbase, at the top of the backfill to the depths as directed by the Engineer. Bring the surface to the required grade and rake out and remove stones.
D. Backfilling Trenches in Nonpaved Areas:
   1. Grade the ground to a reasonable uniformity.

2. Leave the mounding over the trenches in a uniform and neat condition, satisfactory to the Engineer.

E. Bedding and Backfilling Pipelines:
   1. Install pipe bedding and initial backfill in accordance with the Borrow and Bedding Section in this division.
   2. Deposit and thoroughly compact the remainder of the backfill in twelve-inch layers.

F. Placing and Compacting Backfill:
   1. The nature of the backfill materials will govern the methods best suited for their placement and compaction.
   2. No stone or rock fragment larger than twelve inches in dimension shall be placed in the backfill.
   3. No material shall be dropped from a height greater than five feet, unless a timber chute is used to break the fall.
   4. Rolling and tamping by mechanical or hand means shall be employed for compacting material in twelve-inch lifts.
   5. Other types of placing and compacting methods may be employed only when approved by the owner's representative.

G. Placing and Compacting Impervious Dam Material:
   1. The impervious dam material will be rolled and tamped by mechanical or hand means.
   2. Material shall be placed in lifts not greater than six inches.

H. Improper Backfill:
   1. When excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.
   2. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.
   3. Excavation, backfilling and compacting work performed to correct improper backfilling shall be performed at no additional cost to the Owner.
   4. Retesting shall be performed by the Contractor at his expense.

END OF DIVISION 312333

DIVISION 312500 - TEMPORARY EROSION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
1. The work under this section shall include provision of all labor, equipment, materials and maintenance of temporary erosion control devices as specified herein, as shown on the Drawings and as directed by the Engineer.
2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices or as required to control erosion that occurs during normal construction operations.
3. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
4. After awarded the Contract, prior to commencement of construction activities, meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.

B. Related Work Specified Elsewhere:
1. Site work is specified in appropriate sections of this Division.
2. Provisions stipulated in Environmental Protection.

C. Design Criteria:
1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.
2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved.

1.2 SUBMITTALS

A. The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of the responsibility of completion of the work as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Baled Straw: At least 14" by 18" by 30" securely tied to form a firm bale, staked as necessary to hold the bale in place.
B. Sand Bags: Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.
C. Mulches:
1. Loose straw, straw, peat moss, wood chips, bark mulch, crushed stone, wood excelsior, or wood fiber cellulose.

2. Type and use shall be as specified by the "Maine Erosion and Sedimentation Control Handbook for Construction - Best Management Practices" prepared by the Maine DEP and the Soil and Water Conservation Commission herein after referred to as the BMP.

D. Mats and Nettings:
1. Twisted Craft paper, yarn, jute, excelsior wood fiber mats, glass fiber and plastic film.
2. Type and use shall be as specified in the BMP.

E. Permanent Seed: Conservation mix appropriate to the predominant soil conditions as specified in the BMP and subject to approval by the Engineer.

F. Temporary Seeding: Use species appropriate for soil conditions and season as specified in the BMP and subject to approval by the Engineer.

G. Water: The Contractor shall provide water and equipment to control dust, as directed by the Engineer.

H. Filter Fabrics: Filter fabric shall be of one of the commercially available brands such as Mirafi, Typar or equivalent. The Engineer prior to installation shall approve fabric types for particular applications.

2.2 CONSTRUCTION REQUIREMENTS

A. Temporary Erosion Checks:
1. Temporary erosion checks shall be constructed in ditches and other locations as necessary. Stones shall be used for check dams as specified.
2. Baled hay, sand bags or siltation fence may be used in an arrangement to fit local conditions.

B. Temporary Berms: Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.

C. Temporary Seeding: Areas to remain exposed for a time exceeding 3 weeks shall receive temporary seeding as indicated below:

Season	Seed	Rate
Summer (5/15 - 8/15)	Sudangrass	40 lbs/acre
Late Summer/Early Fall	Oats	80 lbs/acre
(8/15 - 9/15)	Annual Ryegrass	40 lbs/acre
Fall (9/15 - 10/1)	Winter Rye	112 lbs/acre
Winter (10/1 - 4/1)	Mulch w/Dormant Seed	80 lbs/acre*
Spring (4/1 - 7/1)	Oats	80 lbs/acre
	Annual Ryegrass	40 lbs/acre

* Seed rate only

D. Siltation fences shall consist of porous filter fabric with a wire mesh backing and shall be supported by posts as per manufacturer's recommendations. The Engineer shall approve fabric.

E. Mulch All Areas Receiving Seeding: use either wood cellulose fiber mulch (750 lbs/acre); or straw mulch with chemical tack (as per manufacturers specifications). Wetting for small areas may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Temporary Erosion Checks:

1. Temporary erosion checks shall be constructed in ditches and at other locations designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales and bags to fit local conditions.
2. Baled hay, silt fences, or sandbags, or some combination, may be used in other areas as necessary to inhibit soil erosion.
3. Siltation fence, if called for in the plans, shall be located and installed as shown.

B. Maintenance:

Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor as appropriate.

C. Removing and Disposing of Materials:

1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of as approved by the Engineer.
2. When removed, such devices may be reused in other locations provided they are in good condition and suitable to perform the erosion control for which they are intended.
3. When dispersed over adjacent areas, the material shall be scattered to the extent that it causes no unsightly conditions nor creates future maintenance problems.

END OF DIVISION 312500

DIVISION 312500.13 - ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 DEFINITIONS OF CONTAMINANTS:

A. Sediment: Soil and other debris that has been eroded and transported by runoff water.
B. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from construction activity.
C. Chemical Wastes: Includes salts, acids, alkalis, herbicides, pesticides, and organic chemicals.
D. Sanitary Wastes: Wastes characterized as domestic sanitary sewage.

1.2 ENVIRONMENTAL PROTECTION REQUIREMENTS:

A. Provide and maintain during the life of the Contract, environmental protection as defined herein. Provide environmental protective measures as required to prevent or control pollution that develops during normal construction practice. Provide environmental protection measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with all federal, state, and local regulations pertaining to water, air, and noise pollution.

PART 2 - PRODUCTS

A. Temporary Erosion Control Blanket-Adhere to specifications in 717.061 in the MDOT Standard Specifications Highways and Bridges. Silt Fence-Terratex pre-assembled or equal.

PART 3 - EXECUTION

A. PROTECTION OF NATURAL RESOURCES:
The natural resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their existing condition or restored to an equivalent or improved condition upon completion of the work. Confine construction activities to areas defined by the work schedule, drawings, and specifications.
B. Land Resources: except in areas indicated to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without special approval of the owner's representative. Do not fasten or attach ropes, cables, or guys to any existing nearby trees for anchorages unless specifically authorized. Where such special emergency use is authorized, the Contractor shall be responsible for any resultant damage.
C. Protection: protect existing trees that are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operators. Remove displaced rocks from uncleared areas. Protect monuments and markers.
D. Repair and Restoration: repair or restore to their original condition all trees or other landscape features scarred or damaged by the equipment operations. Obtain approval of the repair or restoration from the Engineer prior to its initiation.
E. Temporary Construction: remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and all other vestiges of construction. Temporary roads, parking areas, and similar temporary use

areas shall be graded in conformance with surrounding areas and revegetated, seeded, or sodded as required by the plans.

F. Water Resources: perform all work in such a manner that any adverse environmental impact on water resources is avoided. Storage of hydraulic fluid is not permitted on-site. Quantities of bulk materials shall be reduced to a level acceptable to the owner's representative.

3.2 EROSION AND SEDIMENT CONTROL MEASURES:

A. Burn-off: Burn-off of ground cover is not permitted.
B. Protection of Erodible Soils: All earthwork brought to final grade shall be immediately finished as indicated or specified. Protect immediately side slopes and backslopes upon completion of rough grading. Plan and conduct all earthwork in such a manner as to minimize the duration of exposure of unprotected soils, and in no case shall exposure exceed 7 days. Consult weather forecasts prior to exposing large areas of soil. Check erosion control measures before forecasted major storm events.
C. Temporary Protection to Erodible Soils: Utilize the following methods to prevent erosion and control sedimentation.
    1. Vegetation and Mulch: Provide temporary protection on all side and back slopes as soon as rough grading is completed or sufficient soil is exposed to require protection to prevent erosion. Such protection shall be by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

3.3 CONTROL AND DISPOSAL OF SOLID, CHEMICAL AND SANITARY WASTES:

A. Pick up solid wastes and place in containers that are emptied on a regular schedule. The preparation, cooking and disposing of food is strictly prohibited on the project site. Conduct handling and disposal of wastes to prevent contamination of the site and other areas. On completion, leave areas clean and natural looking. Remove signs of temporary construction and activities incidental to construction of permanent work in place
B. Disposal of Rubbish, Garbage, and Debris: dispose of rubbish, garbage and debris in accordance with the requirements specified herein.
C. Sewage, Odor, and Pest Control: dispose of sewage through chemical toilets or comparable effective units and periodically empty wastes. Include provisions for pest control and elimination of odors.
D. Petroleum Products: conduct fueling and lubricating of equipment and motor vehicles in a manner that affords the maximum protection against spills and evaporation. Dispose of lubricants to be discarded and excess oil in accordance with approved procedures meeting federal, state and local regulations.

3.4 DUST CONTROL:

A. Keep dust down at all times, including nonworking hours, weekends, and holidays. Sprinkle or treat the soil at the site, haul roads, and other areas disturbed by operations with dust suppressers.

Petroleum products will not be used as suppressers. No dry power brooming is permitted. Instead use vacuuming, wet mopping, wet sweeping, or wet power brooming.

END OF DIVISION 312500.13

DIVISION 321116 - BORROW AND BEDDING MATERIAL (SUBBASE COURSES)

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide, place and compact borrow and bedding material in authorized excavation(s) below normal depth and in other location(s) as shown on the Drawings and/or as specified herein.

B. Related Work Specified Elsewhere:

1. Trench Excavation - Earth, Trench Excavation - Ledge, Trench Backfilling, Compaction, Control and Testing are specified in the appropriate sections in this division.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Gravel Borrow:

1. Well graded granular material having no rocks with a maximum dimension over 6-inches, except where it is used for pipe bedding in which case the maximum size shall be 2-inches.
2. Free from frozen material and other unsuitable material.
3. That portion passing a three-inch square mesh sieve shall contain not more than 70 percent passing a l/4-inch mesh sieve and not more than l0 percent passing a number 200 mesh sieve when used as pipe bedding material and not more than 5 percent passing a number 200 mesh sieve when used as backfill around structures.

B. Screened Stone (Bedding Material):

1. Shall be either screened stone or crushed stone and shall be well graded in size from 1/4 inch to 3/4 inch.
2. Clean, hard, and durable particles or fragments.
3. Free from dirt, vegetable, or other objectionable matter, and excess of soft, thin elongated, laminated or disintegrated pieces.
4. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening
1"	100
3/4"	90-100
3/8"	20-50
No. 4	0-10
No. 8	0-5

C. Sand:

1. Clean, hard and durable particles or fragments.
2. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening
3/8"	100
No.4	95-100
No. 16	50-85
No. 50	10-30
No. 100	2-10

D. Underdrain Backfill Material:
   1. Free from organic matter.
   2. Gradations:

Type "B" Underdrain

Sieve Designation	% by Weight Passing Square Mesh Sieves
1 inch	95-100
½ inch	75-100
No. 4	50-100
No. 20	15-80
No. 50	0-15
No. 100	0-10

Type "C" Underdrain

Sieve Designation	% by Weight Passing Square Mesh Sieves
1 inch	100
3/4 inch	90-100
3/8 inch	0-75
No. 4	0-25
No. 10	0-5

   Filter Fabric Lined Trench with 3"-6" coarse aggregate.
   3. Shall conform to AASHTO T 27

E. French Drain Stone
   1. Hard, durable rock.
   2. Gradations:

Sieve Designation	% by Weight Passing Square Mesh Sieves
6 inch	90-100
1½ inch	0-40
No. 4	0-5

   3. Shall conform to AASHTO T 27 except that the total material sampled shall be sieved and the minimum weight of the sample will be 120 pounds.

F. 3/4"-Crushed Stone: Crushed Stone shall be a uniform material, containing angular pieces, as are those which come from a mechanical crusher. Gradation requirements shall be as follows:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
1"	98-100
3/4"	0-30
No. 200	0-3

G. Impervious Dam Material: The impervious dam material shall be uniform natural or selected cohesive soil with minimum of 30 percent of the material passing a No. 200 sieve. It shall not

contain vegetation, masses of roots, individual roots larger than 12 in. long or 1/2 in. in diameter or other porous or organic matter.

H. Unsuitable Soil Materials: Shall be those defined in AASHTO M145, soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also, peat and other highly organic soils.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Place bedding material, initial backfill, impervious dam material and fill below pipe bedding in layers of uniform thickness not greater than six inches or as shown on the Drawings.
B. Thoroughly compact each layer by means of a suitable vibrator or mechanical tamper.
C. In excavations below normal depth or where unsuitable materials are excavated, gravel borrow shall be used unless ground water makes such usage not practical; if such is the case, then screened gravel shall be used.
D. No stone 2" in diameter or larger shall be allowed within 6" of the pipe.
E. Where soft silt and clay soils are encountered the trench shall be excavated 6 inches below the normal bedding and backfilled with 6-inches of compacted sand.
F. No stone or rock greater than 12 inches measured at any point shall be placed in the trench backfill.
G. The following schedule gives the minimum bedding requirements for various types of pipe. Dimensions refer to distance below bottom of pipe.
    1. PVC or ADS Pipe 6 inches min.
    2. P.E. Pipe 6 inches min.
    3. Culverts and Underdrain 6 inches min.
    4. Storm Drain Pipe 6 inches min.
H. The following schedule gives the minimum initial backfill requirements for various types of pipes.
    1. PVC or ADS Pipe 6 inches min. over the top of the pipe
    2. P.E. Pipe 6 inches min. over the top of the pipe
    3. Culverts and Underdrain 6 inches min. over the top of the pipe
    4. Storm Drain Pipe 6 inches min. over the top of the pipe.

END OF DIVISION 321116

DIVISION 321123 - AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Aggregate base course.

1.2 RELATED SECTIONS
A. Section 312333 – Trench Backfilling, Compaction, Control & Testing: Compacted fill under base course.

1.3 REFERENCES
A. AASHTO Ml47-65 - Materials for Aggregate and Soil-Aggregate.
B. ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Aggregate for gravel base shall be screened 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	
	MaineDOT Type A Aggregate	MaineDOT Type D Aggregate
1/2 inch	45 - 70	
1/4 inch	30 - 55	25 - 65
No. 40	0 - 20	0 - 30
No. 200	0 - 6.0	0 - 7

Type “A” aggregate for base shall not contain particles of rock, which will not pass the 2-inch square mesh sieve.
Type “D” aggregate for base shall not contain particles of rock, which will not pass the 6-inch square mesh sieve.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify subbase has been inspected, gradients and elevations are correct, and are dry.

3.2 AGGREGATE BASE PLACEMENT

A. Spread Type D base course aggregate over the prepared backfill. Place Type D base course aggregate in 8-inch layers and compact.
B. Spread Type A base course aggregate over prepared Type D base course. Place Type A base course aggregate in a 3-inch layer and compact.
C. Level and contour surfaces to elevations and gradients indicated.
D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
E. Compact placed aggregate materials to achieve compaction to 95 percent of its maximum dry density in accordance with ANSI/ASTM D698 and ANSI/ASTM D1557.
F. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
G. Use mechanical vibrating tamping in areas inaccessible to compaction equipment.

3.3 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
B. Scheduled Compacted Thickness: Within 1/4 inch.
C. Variation from True Elevation: Within 1/2 inch.

3.4 FIELD QUALITY CONTROL

A. Gradation of Aggregate: In accordance with ASTM C136.
B. Compaction testing will be performed in accordance with ANSI/ASTM D698 and ANSI/ASTM D1557.
C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
D. Frequency of Tests: Owners and Engineers discretion.

END OF DIVISION 321123

DIVISION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Asphaltic concrete paving and surface sealer; wearing binder or base course.

1.2 RELATED SECTIONS
- A. Section 312213 – Rough Grading: Preparation of site for paving and base.
- B. Section 312333 – Trench Backfilling, Compaction, Control & Testing: Compacted subbase for paving.
- C. 321123 - Aggregate Base Course

1.3 REFERENCES
- A. MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types; The Asphalt Institute.
- B. MS-3 - Asphalt Plant Manual - The Asphalt Institute (AI).
- C. MS-8 - Asphalt Paving Manual - The Asphalt Institute (AI).
- D. MS-19 - Basic Asphalt Emulsion Manual, The Asphalt Institute (AI).

1.4 QUALITY ASSURANCE
- A. Perform Work in accordance with AI Manual MS-8.
- B. Mixing Plant: Conform to AI Manual MS-3.
- C. Obtain materials from same source throughout.

1.5 ENVIRONMENTAL REQUIREMENTS
- A. Do not place asphalt when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.1 MATERIALS
- A. Aggregate for Binder Course Mix: MDOT 403.207
- B. Aggregate for Wearing Course Mix: MDOT 403.208
- C. Fine Aggregate: In accordance with MDOT standards.

2.2 ACCESSORIES
- A. Tack Coat (if required): Homogeneous, medium curing, liquid asphalt in accordance with MDOT standards.

2.3 ASPHALT PAVING MIX
- A. Binder Course: 4.5 to 6 percent of asphalt cement by weight in mixture in accordance with AI MS-2 standards.
- B. Wearing Course: 5 to 7 percent of asphalt cement by weight in mixture in accordance with AI MS-2 standards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that compacted aggregate base course is dry and ready to support paving and imposed loads.
B. Verify gradients and elevations of base are correct.

3.2 BASE

A. Section 321123 - Aggregate Base Course forms the base construction for work of this Section.

3.3 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Thickness of binder course shall be in accordance with construction drawings.
B. Thickness of surface course shall be in accordance with construction drawings.
C. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas accessible to rolling equipment.
D. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.4 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
B. Scheduled Compacted Thickness: Within 1/4 inch.
C. Variation from True Elevation: Within 1/2 inch.

3.5 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 2 days.

END OF DIVISION 321216

DIVISION 323200 – PRECAST CONCRETE BLOCK RETAINING WALLS

FROM MAINE DOT STANDARD SPECIFICATIONS
SECTION 672 - PRECAST CONCRETE BLOCK GRAVITY WALL

672.01 Description The work under this item shall consist of design, fabrication, furnishing and construction of a Precast Concrete Block Gravity Wall in accordance with these specifications and in close conformance with the lines and grades shown on the Plans, or established by the Engineer-of-Record. The Precast Concrete Block Gravity Wall shall consist of facing blocks made of wet cast concrete made from Portland cement, water, chemical admixtures, and aggregates, supported on concrete leveling pads, and if required, geosynthetic-reinforced backfill.

Included in the scope of the precast gravity wall construction are: geotechnical design of any wall with an exposed height greater than 4.5 feet or as specified on the Plans, all grading necessary for wall construction, compaction of the wall foundation soil, backfill, piped drainage, construction of leveling pads, and block wall installation. The top of the upper row of blocks shall be at or above the top of the face elevation shown on the Plans.

672.02 Quality Assurance The wall system shall be one of the approved combinations of facing block and soil reinforcement systems noted in the Plans or on the Department's Qualified Products List (QPL). Alternate wall systems will not be considered for this Item.

All design calculations and Shop Drawings shall be signed, checked, and sealed by a Professional Engineer licensed in the State of Maine.

The Contractor shall require the wall design-supplier to provide an on-site, qualified experienced technical representative to advise the Contractor concerning proper installation procedures. The technical representative shall be on-site during initial stages of installation and thereafter shall remain available for consultation as necessary for the Contractor or as required by the Engineer-of-Record.

672.03 Materials for walls shall meet the requirements of the following sections of Division 700:

Gravel Borrow	703.20
Crushed Stone, ¾ -Inch	703.13
Underdrain Pipe	706.06 or 706.09
Reinforcing Steel	709.01
Reinforcement Geotextile	722.01
Drainage Geotextile	722.02

The Contractor is cautioned that all of the materials listed are not required for every Precast Concrete Block Gravity Wall. The Contractor shall furnish the Engineer-of-Record a Materials Certification Letter certifying that the applicable materials comply with this section of the specifications. Materials shall meet the following additional requirements:

672.31 Concrete Units The Materials Certification Letter described above shall contain the date of concrete casting, a lot identification number, compressive strength results, and entrained air results.

All prefabricated concrete units shall conform to the requirements of Section 712.061 with the following exceptions:

Materials are modified as follows:

The maximum water cement ratio shall be 0.42, use of calcium nitrite is not required, and the minimum 28-day compressive strength shall be 4600 psi.

The forms shall remain in place until the concrete has gained sufficient strength such that removal of the forms and subsequent handling will not damage the units.

Face texture of the units shall be a formed finish on all exposed surfaces. Pigment shall be added during the casting process of the concrete unit to achieve a consistent shade of gray or other color as determined by the Engineer-of-Record.

The Contractor shall make and test at least one set of cylinders for every 50 CY of production concrete used to cast the concrete units. The Contractor shall make four cylinders for use by the Maine DOT to represent every 200 CY or fraction thereof.

Tolerances. Maximum dimensional deviation of formed unit dimensions shall be ½ - inch or 2 percent or the manufacturer's published tolerances, whichever is less. Units not meeting the specified tolerances will be rejected. Geosynthetic reinforcement shall be as required by the proprietary wall system manufacturer or wall designer.

672.32 Geosynthetic reinforcement shall consist of a geotextile or geogrid approved by the Geotechnical Engineer. Substitution of a geosynthetic other than that required by the proprietary wall system manufacturer shall not be allowed unless approved by the Geotechnical Engineer after submittal of shop drawings and pullout and interface friction test data.

A. Geotextiles and Thread for Sewing. Woven or nonwoven geotextiles shall consist of long chain polymeric filaments or yarns formed into a stable network such that the filaments or yarns retain their position relative to each other during handling, placement, and design life. At least 95 percent by weight of the long chain polymer shall be polyolefin or polyester. The material shall be free of defects and tears. Geotextiles used for reinforcement shall conform as a minimum to the properties indicated for 722.01, Stabilization/Reinforcement Geotextile and shall meet the requirements of part D and E below. Geotextiles shall have a minimum permeability greater or equal to that shown on the Shop Drawings and the reinforced soil permeability.

B. Geogrids. The geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock. The geogrid structure shall be dimensionally stable and able to retain its geometry under manufacture, transport and installation. Geogrids shall conform as a minimum to the criteria specified in part D and E below.

C. Required Properties. The specific geosynthetic materials shall be preapproved and shall the have the ultimate tensile strength (Tult) shown on the approved Shop Drawings for the geosynthetic specified and for the fill type shown. Tult shall be determined from wide width

tests specified in ASTM D 4595 for geotextiles and ASTM D 6637 or GRI:GG1 for geogrids. The ultimate tensile strength value is based on the minimum average roll values (MARV) for the product.

D. The geosynthetic shall conform to the following criteria:
1. PP and HDPE: Min. retained strength of 70 percent after 150 hours, per ASTM D-4355.
2. HDPE: Grade = E-4, E-5, E-8, E-9, E-10, E-11, J-3, J-4, or J-5, per ASTM D-1248.
3. PET: Molecular weight (Mn) > 25,000, per GRI:GG8 and ASTM D-4603.
4. PET: Carboxyl end group (CEG) <30 mmol/kg, GRI:GG7.
5. All polymers: Minimum Weight per Unit Area of 8 oz/yd2, per ASTM D-5261.
6. All Polymers: Maximum 0 percent post-consumer recycled material by weight.
7. A default total reduction factor for creep, durability, and installation damage of RF = 7 may be used in design, provided the criteria of 2 through 6 are satisfied and 1 is adjusted to 70 percent after 500 hours is satisfied.

E. Manufacturer Quality Control. The geosynthetic reinforcements shall be manufactured with a high degree of quality control. The Manufacturer is responsible for establishing and maintaining a quality control program to ensure compliance with the requirements of the specification. The purpose of the QC testing program is to verify that the reinforcement geosynthetic being supplied to the project is representative of the material used for performance testing and approval. Conformance testing shall be performed as part of the manufacturing process and may vary for each type of product. As a minimum the following index tests shall be considered as applicable for an acceptable QA/QC program:

Property Test	Procedure
1.Specific Gravity (HDPE only)	ASTM D-1505
2.Ultimate Tensile Strength	ASTM D-4595 GRI:GG1
3.Melt Flow (HDPE and PP only)	ASTM D-1238
4.Intrinsic Viscosity (PET only)	ASTM D-4603
5.Carboxyl End Group (PET only)	ASTM D-2455

F. Sampling Testing and Acceptance. Sampling and conformance testing shall be in accordance with ASTM D-4354. Conformance testing procedures are established above. Geosynthetic product acceptance shall be based on ASTM D-4759. The quality control certificate shall include:

1.Roll numbers and identification
2.Sampling procedures
3.Results of quality control tests, including a description of test methods used.

G. Certification. The Contractor shall submit a manufacturer's certification that the geosynthetics supplied meet the respective index criteria set when the geosynthetic was approved, measured in full accordance with all test methods and standards specified, or referenced, in this specification.

The manufacturer's certificate shall state that the furnished geosynthetic meets the requirements of these specifications as evaluated by the manufacturer's quality control program. The values submitted shall be certified by a person having legal authority to bond the manufacturer. In case of dispute over validity of values, the Engineer-of-Record can require the Contractor to supply test data from an agency approved laboratory to support the values submitted, at the Contractor's cost.

672.33 Geosynthetic Connection Reinforcing bar used in the geosynthetic connection shall be a minimum ½-inch diameter corrosion resistant reinforcing bar, coated on the ends and meeting the requirements of Section 503, Reinforcing Steel. Installation shall be in accordance with manufacturer's recommendations.

672.34 Concrete Leveling Pad Concrete for leveling pads shall be Fill Concrete conforming to the requirements of Section 502 Structural Concrete. Leveling pad shall have a minimum thickness of 4 inches. Unless otherwise specified, concrete for leveling pads shall be accepted under Method "C" requirements.

672.35 Backfill Material Backfill material placed behind the concrete units shall meet the requirements of Section 703.20 Gravel Borrow, except that the backfill material shall only contain particles that will pass the 3-inch square mesh sieve. The contractor is required to submit a grain size distribution curve (ASTM D 422) and a moisture-density relationship curve (AASHTO T-180) for acceptance of the proposed backfill material and determination of the appropriate installation damage reduction factor (RFID). Walls with reinforced backfill require that the backfill material be subjected to pH testing to determine the appropriate durability reduction factor (RFD). Backfill materials shall meet the criteria in the following table:

Base Polymer	Property	Criteria	Test Method
Polyester (PET)	pH	3< pH < 9	AASHTO T-289
Polyolefin (PP & HDPE)	pH	pH > 3	AASHTO T-289

Material between blocks must be Gravel Borrow, or Crushed Stone, ¾ -Inch.

672.36 Materials Certification Letter The Contractor, or the supplier as his agent, shall furnish the Engineer-of-Record a Materials Certification Letter for the above materials, including the backfill material, in accordance with Section 700 of the Standard Specifications. A copy of all test results performed by the Contractor or his supplier necessary to assure contract compliance shall also be furnished to the Engineer-of-Record. The Engineer-of-Record will base acceptance upon the materials Certificate Letter, accompanying test reports, and visual inspection.

672.04 Design Requirements The wall shall be designed with a service life of not less than 75 years. The Precast Concrete Block Gravity Wall shall be designed and sealed by a Professional Engineer

licensed in the State of Maine. The wall shall be designed in accordance with the following:

1. AASHTO LRFD Bridge Design Specifications, current edition, herein referred to as LRFD

2. FHWA-NHI-10-024 and FHWA-NHI-10-025, Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, Volumes I and II, current edition.
3. FHWA-NHI-09-087 Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, current edition.
4. The Contract Plans
5. The requirements specified herein
6. The manufacturer's requirements

Where conflicting requirements occur, the more stringent requirements shall govern.

Forty-five days prior to beginning construction of the wall, the design computations shall be submitted to the Resident for review by the Geotechnical Engineer. Any additional design or costs arising as a result of rejection of a wall design by the Geotechnical Engineer shall be borne by the Contractor.

Design calculations that consist of computer program generated output shall be supplemented with at least one hand calculation and graphic demonstrating the design methodology used. Design calculations shall provide thorough documentation of the sources of equations used and material properties. The design by the wall system supplier shall consider the stability of the wall as outlined below and in the Contract Documents:

A. Failure Plane The theoretical failure plane within the reinforced soil mass shall be determined in accordance with LRFD Article 11 and be analyzed so that the soil stabilizing components extend sufficiently beyond the failure plane within the reinforced soil mass to stabilize the material.

B. External Loads External loads which affect the internal and external stability such as those applied through traffic loadings, impact on traffic barrier posts, slope surcharge, hydrostatic, and seismic loads shall be accounted for in the design. Traffic surcharge and traffic impact loads shall be calculated and applied in compliance with LRFD Section 11.

C. External Stability Loads and load combinations selected for design shall be consistent with LRFD. Application of load factors shall be taken as specified in LRFD Section 11. Sliding resistance factors and bearing resistance factors shall be consistent with LRFD. Overturning and sliding provisions of LRFD shall apply.

D. Internal Stability Evaluation of reinforcement pullout, reinforcement rupture and reinforcement/block connection pullout or rupture shall be consistent with LRFD Section 11, and checked at each level. Loads, load combinations and load factors shall be as specified in LRFD Section 11. Resistance factors for internal design are specified in LRFD Section 11. Maximum reinforcement loads shall be calculated using the Simplified Method approach. Calculations for

factored stresses and resistances shall be based upon assumed conditions at the end of the design life.

a. Geosynthetic Reinforcement Design Tensile Resistance The nominal long term reinforcement design strength (Tal) shall be determined by reducing Tult by reduction factors (RF) in accordance with the documents referenced above. The designer shall procure and use the manufacturers tested and certified geosynthetic reinforcement reduction factors for creep (RFCR), durability (RFD), and installation damage (RFID) to determine Tal. In absence of manufacturers tested and certified reduction factors, a combined default reduction factor RF = 7 shall be used in accordance with the referenced documents. For RFID, the installation damage reduction factor shall be checked in accordance with LRFD and FHWA-NHI-09-087.

b. Reinforcement/Facing Connection Design Strength The nominal long-term connection strength between the geosynthetic reinforcement and the concrete blocks shall be checked in accordance with LRFD and FHWA-NHI-10-024 and FHWA-NHI- 10-025.

c. Reinforcement Pullout The pullout resistance factor, (F*), and scale effect correction factor (α) used in pullout design, shall be determined from project specific pullout tests using the proposed geosynthetic in the specified project backfill material or equivalent soil. The pullout resistance factors shall be determined in accordance with LRFD and FHWA-NHI-10-024 and FHWA-NHI-10-025. In the absence of test data, empirical relationships may be used to determine the pullout resistance factors, any empirical relationships used in design shall be referenced in the design calculations.

E. Backfill and Foundation Soils Parameters The friction angle of the backfill used in the reinforced fill zone for internal stability design shall be assumed have a friction angle of 34 degrees unless specific project select backfill is tested for frictional strength. The friction angle of the foundation soils and random backfill shall be assumed to be 30 degrees unless otherwise shown on the plans.

F. Reinforcement Length The soil reinforcement shall be the same length from the bottom to the top of each wall section. The minimum length of the soil reinforcement shall be 8 ft, but shall not be less than 70 percent of the wall height, H, for walls with level surcharges, or 70 percent of H1 for walls with a sloped surcharge or walls supporting an abutment. The mechanical wall height, H or H1, shall be the vertical difference between the top of the leveling footing and the elevation at which the failure surface, as described above, intercepts the ground surface supported by the wall.

G. Bearing Resistance The factored bearing pressures under the Precast Concrete Block Gravity Wall shall be clearly indicated on the Shop Drawings. Walls shall be dimensioned so that the factored bearing resistance of the foundation soils, as noted on the Plans, is not exceeded.

H. Facing Stability Stability calculations for the concrete facing blocks shall be in accordance with LRFD, and shall include an evaluation of the maximum vertical spacing between reinforcement layers.

I. Stability During Construction Walls shall be designed to resist failure by instability of temporary construction slope. Passive pressure in front of the wall mass shall be assumed to be zero for design purposes.

J. Design Life The wall design life shall be a minimum of 75 years.

K. Depth of Embedment The depth of embedment for frost protection and stability shall be at or below the elevation shown on the Plans and the approved Shop Drawings.

L. Drainage System Piped drainage shall be designed to collect and dispose of water from the base of the reinforced soil zone and backfill soil. This shall outlet into surrounding drainage systems or ditches.

672.05 Submittals The Contractor shall supply wall design computations, wall details, dimensions, quantities, and cross sections necessary to construct the wall. A sample hand calculation including all equations, parameter values used, units, theory, free-body diagram, comparison to design requirements, etc. shall be provided. Spread sheet calculations alone are not acceptable.

Forty-five days prior to beginning construction of the wall, four (4) sets of the wall design computations and Shop Drawings shall be submitted to the Resident for review by the Geotechnical Engineer. Mix design information shall be submitted at the same time, including aggregate source, current gradation, aggregate quality information and concrete unit weight.

The contractor shall also submit backfill material test results as part of the wall submittal package. Backfill material test results shall include grain size distribution curve, moisture-density relationship curve, and pH test results required for reinforced backfill only.

If geotechnical design is required, the fully detailed plans shall be prepared in conformance with Section 105 and shall include, but not be limited to the following items:

A. A plan and elevation sheet or sheets for each wall, containing the following: elevations at the top of leveling pads, the distance along the face of the wall to all steps in the leveling pads, the location of the original and final ground line.

B. All details for foundations and leveling pads, including details for steps in the leveling pads, as well as allowable and actual maximum bearing pressures shall be provided.

C. Details for the barriers, posts, curbs and facing as required by the project conditions.

D. Design computations prepared and sealed by a licensed Professional Engineer.

E. Prior to the beginning of construction, the contractor shall supply the Resident with two copies of the design-supplier's Installation Manual. In addition, the Contractor

shall have two copies of the Installation Manual on the project site.

672.06 Construction Requirements The Precast Concrete Block Gravity Wall shall have the following construction requirements:

A. Excavation. The excavation and use as fill or disposal of all excavated material shall meet the requirements of Section 203 -- Excavation and Embankment, except as modified herein.

B. Foundation. The area upon which the prefabricated block gravity wall structure is to rest, and within the limits shown on the submitted plans, shall be graded for a width equal to, or exceeding, the length of the blocks. Prior to wall and leveling pad construction, this foundation material shall be compacted to at least 95 percent of maximum laboratory dry density (AASHTO T-180 Method C or D). Frozen and unsuitable soil shall be removed and replaced with gravel borrow compacted to 95 percent of AASHTO T-180.

   A concrete leveling pad shall have a minimum thickness of 4 inches and shall be constructed as indicated on the plans. Dimensions may be modified per the wall supplier's recommendations, with written approval of the Geotechnical Engineer. The leveling pad shall be cast to the design elevations as shown on the plans, or as required by the wall supplier upon written approval of the Geotechnical Engineer. The allowable elevation tolerances from the design elevations are +0.01 feet and -0.02 feet. Leveling pads which do not meet this requirement shall be repaired or replaced as directed by the Resident at no additional cost to the Department. Placement of wall units may begin after the strength of the concrete leveling pad reaches 1000 psi or is adequate to support the proposed loads. Contractor may begin placement of concrete block units after 12 hours at his own risk.

C. Method and Equipment. Prior to erection of the prefabricated concrete block wall, the Contractor shall furnish the Resident with detailed information concerning the proposed construction method and equipment to be used. The erection procedure shall be in accordance with the manufacturer's instructions. Any units that are damaged due to handling will be replaced at the Contractor's expense.

D. Installation of Wall Units. A field representative from the wall system being used shall be available, as needed, during the erection of the wall. The services of the representative shall be at no additional cost to the project. Horizontal joint fillers shall be installed as needed.

   The maximum offset in any unit horizontal joint shall be 1/4 inch. The prefabricated wall blocks shall be installed to a tolerance of plus or minus 3/4 inch in 10 feet in vertical alignment and horizontal alignment.

E. Backfill Placement. Backfill placement shall closely follow the erection of each row of prefabricated wall units. The Contractor shall decrease the lift thickness if necessary to

obtain the specified density. The maximum lift thickness shall be 8 inches loose. Gravel borrow backfill shall be compacted in accordance with Section 203.12 except that the minimum required compaction shall be at least 92 percent of maximum density as determined by AASHTO T-180 Method C or D. Backfill compaction shall be accomplished without disturbance or displacement of the wall blocks. Sheepsfoot rollers will not be allowed. Whenever a compaction test fails, no additional backfill shall be placed over the area until the lift is recompacted and a passing test achieved.

The moisture content of the backfill material prior to and during compaction shall be uniform throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with AASHTO T-180, Method C or D. At the end of the day's operations, the Contractor shall shape the last level of backfill so as to direct runoff of rain water away from the wall face.

Material between blocks must be Gravel Borrow or Crushed Stone, ¾ -Inch, meeting the requirements of Section 703.13. If Gravel Borrow is used between blocks, 722.02 drainage geotextile shall be placed behind vertical joints to prevent loss of granular material between blocks. Compliance with the gradation requirements shall be the responsibility of the Contractor, who shall furnish a copy of the backfill test results prior to construction. If crushed stone, 3/4-inch is used between blocks, no geotextile is required behind vertical joints.

672.07 Method of Measurement Precast Concrete Block Gravity Wall will be measured by the square foot of front surface not to exceed the dimensions shown on the Contract Plans unless authorized by the Resident. Vertical and horizontal dimensions will be from the edges of the blocks. No field measurements for computations will be made unless the Resident specifies, in writing, a change in the limits indicated on the Plans.

672.08 Basis of Payment The accepted quantity of Precast Concrete Block Gravity Wall will be paid for at the contract unit price per square foot complete in place. Payment shall be full compensation for furnishing geotechnical design as required, all labor, equipment and materials including all precast concrete units, hardware, joint fillers, geosynthetics, reinforcing steel, drainage pipe, backfill materials and technical field representative. Excavation, foundation material and backfill material will all be incidental to the Precast Concrete Block Gravity Wall.

Cost of cast-in-place concrete for leveling pad will not be paid for separately, but will be considered incidental to the Precast Concrete Block Gravity Wall.

There will be no allowance for excavating and backfilling for the Precast Concrete Block Gravity Wall beyond the limits shown on the approved submitted plans, except for excavation required to remove unsuitable subsoil in preparation for the foundation.

Payment for excavating unsuitable subsoil shall be full compensation for all costs of pumping, drainage, sheeting, bracing and incidentals for proper execution of the work, and will be paid as Common Excavation in accordance with Section 203.

Payment will be made under:

Pay Item	Pay Unit
672.10 Precast Concrete Block Gravity Wall	Square Foot

END OF DIVISION 323200

DIVISION 329119 - LANDSCAPE GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED
- A. Finish grade subsoil and proof roll.
- B. Place, level, and compact topsoil.

1.02 RELATED WORK
- A. Section 312213 - Rough Grading: Subsoil contouring.
- B. Section 312333 – Trench Backfilling: Backfilling and compacting fill.
- C. Section 312316.13 - Trenching: Excavation, backfill, and compacting fill in trenches.
- D. Section 311216 – Bituminous Concrete Paving (Asphalt Paving)
- E. Section 329300 - Trees, Plants, and Ground Cover: Topsoil fill for trees, plants, and ground cover.

1.03 SAMPLES
- A. Submit samples under provisions of this contract.
- B. Submit 10 lb sample of topsoil to testing laboratory, in airtight container.

1.04 PROTECTION
- A. Protect landscaping and other features remaining as final work.
- B. Protect existing structures, fences, roads, sidewalks, paving, and curbs.

PART 2 - PRODUCTS

2.01 MATERIALS
- A. Topsoil: Reused, free of subsoil, roots, grass, excessive amount of weeds, stone, and foreign matter
- B. Topsoil: Imported, friable loam; free of subsoil, roots, grass, excessive amount of weeds, stone, and foreign matter; acidity range ph of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter.

PART 3 - EXECUTION

3.01 INSPECTION
- A. Verify site conditions and note irregularities affecting work of this Section.
- B. Beginning work of this Section means acceptance of existing conditions.

3.02 SUBSOIL PREPARATION
- A. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones in excess of 1/2 inch in size, and subsoil contaminated with petroleum products.
- B. Scarify subgrade to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.03 PLACING TOPSOIL

A. Place topsoil in areas where sodding and planting is scheduled.
B. Use topsoil in relatively dry state. Place during dry weather.
C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
E. Manually spread topsoil around trees, plants and buildings to prevent damage.
F. Lightly compact or roll placed topsoil.
G. Remove surplus subsoil and topsoil from site.
H. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.04 TOLERANCES

A. Top of Topsoil: Plus or minus ½- inch.

3.05 SCHEDULE OF LOCATIONS

A. The following paragraphs identify compacted topsoil thicknesses for various locations.
B. Sod or loam and seed: 4 inches.
C. Shrub Beds: 18 inches.

END OF DIVISION 329119

DIVISION 329219 - SEEDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish, place, and test topsoil, seed, lime, and fertilizer where shown on the drawings and protect and maintain seeded areas disturbed by construction work, as directed by the Engineer.

B. Related Work Specified Elsewhere (When Applicable): Earthwork, excavation, backfill, compaction, site grading and temporary erosion control are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS AND TESTING

A. Seed:

1. Furnish the Engineer with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
2. This certification shall appear in, or with, all copies of invoices for the seed.
3. The certification shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates and certificates have been approved.
4. Each lot of seed shall be subject to sampling and testing, at the discretion of the Engineer, in accordance with the latest rules and regulations under the Federal Seed Act.

B. Topsoil:

1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished.
2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
3. Have soil samples tested by an independent soils testing laboratory, approved by the Engineer, at the Contractor's expense.
4. Have soil samples tested for physical properties and pH (or lime requirement), for organic matter, available phosphoric acid, and available potash, in accordance with standard practices of soil testing.
5. Approval, by the Engineer, to use topsoil for the work will be dependent upon the results of the soils tests.

C. Lime & Fertilizer:

1. Furnish the Engineer with duplicate copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.
2. Each lot of lime and fertilizer shall be subject to sampling and testing at the discretion of the Engineer.

3. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
4. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

1.3 DELIVERY, STORAGE & HANDLING

A. Seed:
   1. Furnish all seed in sealed standard containers, unless the Engineer grants exception in writing.
   2. Containers shall be labeled in accordance with the United States Engineering Firm of Record of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.

B. Fertilizer:
   1. Furnish all fertilizer in unopened original containers.
   2. Containers shall be labeled with the manufacturer's statement of analysis.

1.4 JOB CONDITIONS

A. Topsoil: Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading.

B. Seeding:
   1. Planting Seasons: The recommended seeding time is from April 1 to September 15. The Contractor may seed at other times except as indicated in the erosion and sedimentation control report. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted.
   2. Weather Conditions:
      a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
      b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
      c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Seed:
   1. Provide the grass seed mixture approved by the Engineer, having the following composition:
      a. Park Mixture:
         50 percent Creeping Red Fescue

30 percent Kentucky Bluegrass
20 percent Perennial Rye

2. Do not use seed, which has become wet, moldy, or otherwise damaged in transit or during storage.

B. Topsoil:
1. Provide the quantity of topsoil necessary, in the opinion of the Engineer, to complete the work.
2. Resuse topsoil from stockpiled material or provide topsoil that is natural, friable clay-loam soil possessing the characteristics of representative soils which produce heavy growths of crops, grass, or other vegetation.
3. Provide topsoil which is reasonably free from subsoil, brush, objectionable weeds, other litter, clay lumps, stones, stumps, roots, objects larger than 2 inches in diameter, and toxic substances which might be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.
4. Obtain topsoil from naturally well-drained areas.

C. Lime:
1. Provide lime, which is ground limestone containing not less than 85% of total carbonate and of such fineness that 90% will pass a No. 20 sieve and 50% will pass a No. #l00 sieve.
2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. #l00 sieve. No additional payment will be made to the Contractor for the increased quantity.

D. Fertilizer:
1. Provide a phosphorous-free fertilizer approved by the Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Equipment:
1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.
2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.

B. Soil: Perform the following work prior to the application of lime, fertilizer or seed.
1. Scarify the subgrade to a depth of 2 inches to allow the bonding of the topsoil with the subsoil.
2. Apply topsoil to a depth of 4 inches or as directed on areas to be seeded.
3. Trim and rake the topsoil to true grades free from unsightly variations, humps, ridges or depressions.
4. Remove all objectionable material and form a finely pulverized seedbed.

3.2 PERFORMANCE

A. Grading:
1. Grade the areas to be seeded as shown on the Drawings or as directed by the Engineer.

2. Leave all surfaces in even and properly compacted condition.
3. Maintain grades on the areas to be seeded in true and even conditions, including any necessary repairs to previously graded areas.

B. Placing Topsoil:
1. Uniformly distribute and evenly spread topsoil on the designated areas.
2. Spread the topsoil in such a manner that planting work can be performed with little additional soil preparation or tillage.
3. Correct any irregularities in the surface resulting from top soiling or other operations to prevent the formation of depressions where water may stand.
4. Thoroughly till the topsoil to a depth of at least 3 inches by plowing, discing, harrowing, or other approved method until the condition of the soil is acceptable to the Engineer.

C. Placing Fertilizer:
1. Distribute fertilizer uniformly at a rate determined by the soils test over the areas to be seeded.
2. Incorporate fertilizer into the soil to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.
3. The incorporation of fertilizer may be a part of the tillage operation specified above.
4. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.

D. Placing Lime:
1. Uniformly distribute lime immediately following or simultaneously with the incorporation of fertilizer.
2. Distribute lime at a rate determined from the pH test, to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.

E. Seeding:
1. Level out any undulations or irregularities in the surface resulting from tillage, fertilizing, liming or other operations before starting seeding operations.
2. Hydro seeding:
    a. Hydro seeding may be performed where approved and with equipment approved by the Engineer.
    b. Sow the seed over designated areas at a minimum rate of 5 pounds per 1000 square feet.
    c. Seed and fertilizing materials shall be kept thoroughly agitated in order to maintain a uniform suspension within the tank of the hydro seeder.
    d. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates.

3. Drill Seeding: N/A

4. Broadcast Seeding:
    a. Broadcast seeding may be performed by equipment approved by the Engineer.

b. Sow the seed uniformly over the designated areas at a rate of 5 pounds per l,000 square feet.
c. Sow half the seed with the equipment moving in one direction and the remainder of the seed with the equipment moving at right angles to the first sowing.
d. Cover the seed to an average depth of l/2 inch by means of hand raking, brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved devices.
e. Do not perform broadcast seeding work during windy weather.

F. Compacting:
1. Seeded areas must be raked lightly after sowing unless seeding is to be directly followed by application of an approved mulch.
2. Compact the entire area immediately after the seeding operations have been completed.
3. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 pounds per linear foot of roller.
4. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
5. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion or at right angles to the prevailing wind to prevent dust.

3.3 PROTECTION & MAINTENANCE

A. Protection:
1. Protect the seeded area against traffic or other use.
2. Erect barricades and place warning signs as needed.

B. Maintenance:
1. Properly care for the seeded areas during the period when the grass is becoming established.
2. The protection period shall extend for l2 months after the completion of the entire project, unless the desired cover, in the opinion of the Engineer, is established in a shorter period of time.

3.4 ACCEPTANCE

A. At final acceptance of the project all areas shall have a close stand of grass with no weeds present and no bare spots greater than three inches (3") in diameter over greater than five percent (5%) of the overall seeded area.

END OF DIVISION 329219

DIVISION 330526 - BURIED UTILITY MARKINGS
(UTILITY LINE SIGNS, MARKERS & FLAGS)

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. This work shall consist of providing utility line markings installed above all buried lines installed as part of this contract as indicated on the Drawings and replacing existing markings disturbed as part of this contract.

B. Related Work Specified Elsewhere:
   1. Pipe, excavation, backfill, insulation are specified in the appropriate Sections in this Division.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and color shall be in accordance with latest AASHTO specifications for pipe and utility marking.

B. For ferrous pipe material use 0.004" minimum polyethylene film; 6" wide clearly marking type of buried utility

C. For non-ferrous pipe material (e.g. Concrete, PVC, PE, etc.) use detection tape composite of polyethylene and metallic core 6" wide clearly marking type of buried utility.

D. Seton Identification Products, New Haven, CT, or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Marking tape shall be installed over utility lines centerline and buried 24" below grade.

B. Markings damaged during opening of trench shall be reinstalled with 2' overlap at broken sections.

END OF DIVISION 330526

DIVISION 334113 - POLYVINYL CHLORIDE (PVC) STORM DRAINAGE PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Provide and install PVC non-pressure pipe and fittings of the size(s) and type(s) and in the location(s) shown on the Drawings and as specified herein.
B. Related Work Specified Elsewhere: (When Applicable)
   1. Excavation and backfill, dewatering, pavement, borrow and bedding material, and cleaning and testing requirements are specified in the appropriate sections of this division.
   2. Pipe & Pipe Fittings.

1.2 QUALITY ASSURANCE

A. Manufacturers:
   1. Certain-Teed.
   2. J-M Manufacturing.
   3. Or equivalent.

1.3 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions of the Construction Contract.
B. Submit manufacturer's "Certification of Conformance" that pipe and fittings meet or exceed the requirements of these Specifications.
C. Submit other documents as specified in the appropriate Sections of this Division.

1.4 DELIVERY STORAGE AND HANDLING

A. Provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets and other materials.
B. Carefully inspect all materials at the time of delivery and just prior to installation.
C. Carefully inspect all pipe and fittings for:
   1. Defects and damage
   2. Deviations beyond allowable tolerances for joint dimensions.
   3. Removal of debris and foreign matter.
D. Examine area and structures to receive piping for:
   1. Defects, such as weak structural components that adversely affect the execution and quality of work.
   2. Deviations beyond allowable tolerance for pipe clearances.
E. All materials and methods not meeting the requirements of the Contract Documents will be rejected.

F. Immediately remove all rejected materials from the project site.

PART 2 - MATERIALS

2.1 MATERIALS

A. Pipe and Fittings:
   1. The polyvinyl chloride pipe and fittings, including those required for stubs, shall conform to ASTM standard specification for PVC Sewer Pipe and Fittings, Designation D 3034 (SDR 35) (4" to 15"), F679 (18" to 27").
   2. Straight pipe shall be furnished in lengths of not more than 20 feet.
   3. Saddles will not be allowed.

B. Joints:
   1. Joints for the polyvinyl chloride pipe shall be push-on joints using factory installed elastomeric ring gaskets.
   2. The gaskets shall be securely fixed in place by the manufacturer, so that they cannot be dislodged during joint assembly.
   3. The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and ground water, and which will endure permanently under the conditions of the proposed use.
   4. The joints shall conform to ASTM Specifications for Joints for Drain and Sewer Plastic Pipes using Flexible Elastomeric Seals, Designation D3212-76.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Inspection:
   1. Each pipe unit shall be inspected before being installed. No single piece of pipe shall be laid unless it is generally straight.
   2. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length.
   3. If a piece of pipe fails to meet this requirement for straightness it shall be rejected and removed from the site.
   4. Any pipe unit or fitting discovered to be defective, either before or after installation, shall be removed and replaced with a sound unit.

B. Jointing:
   1. All pipe and fittings shall be cleared of all debris, dirt, etc., before being installed and shall be kept clean until accepted in the completed work.
   2. Pipe and fittings shall be installed to the lines and grades indicated on the drawings or as required by the Engineer. Care shall be taken to insure true alignments and gradients.
   3. All joint surfaces shall be cleaned. Immediately before jointing the pipe, the bell or groove shall be lubricated in accordance with the manufacturer's recommendation.

4. Each pipe unit shall than be carefully pushed into place without damage to pipe or gasket. Suitable devices shall be used to force the pipe units together so that they will fit with a minimum open recess inside and outside and have tightly sealed joints. Care shall be taken not to use such force as to wedge apart and split the bell or groove ends.
5. Joints shall not be "pulled" or "cramped" unless permitted by the Engineer.

C. Pipe Deflection:
1. Pipe provided under this specification shall be installed so there is no more than a maximum deflection of 5.0 percent. Such deflection shall be computed by multiplying the amount of deflection (normal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
2. The Contractor shall wait a minimum of 30 days after completion of a section of sewer, including placement and compaction of backfill, before measuring the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer and be acceptable to the Engineer.
3. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem as the Engineer may require without additional compensation.

D. Testing:
1. Clean and test pipe in accordance with appropriate sections of this division.

END OF DIVISION 334113

DIVISION 334626 - FILTER FABRIC

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Furnish all materials and install filter fabric of the types, dimensions and in the location(s) shown on the Drawings and specified herein.

B. Related Work Specified Elsewhere:
   1. **Temporary Erosion Control, Riprap and Stone Ditch Protection, and Gabions and Revet Mattresses** are specified in the appropriate sections of this Division.
   2. **Permanent Foundation Bedding Wrap** are specified in the appropriate sections of this Division.

1.2 QUALITY ASSURANCE

A. A competent laboratory must be maintained by the manufacturer of the fabric at the point of manufacture to insure quality control.

B. During all periods of shipment and storage, the fabric shall be wrapped in a heavy-duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140^{O}F, mud, dirt, dust and debris.

1.3 SUBMITTALS

A. Manufacturer shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Filter fabric for use in stabilization, drainage, underdrains, erosion control, and landscaping, as described in **Part 1.1 Section B.1,** shall be formed in widths of not less than six (6) feet and shall meet the requirements of **Table 1**. Both woven and non-woven geotextiles are acceptable; however no "slit-tape" woven fabrics will be permitted for drainage, underdrain, and erosion control applications.

Table 1

Geotextile Mechanical Property	Test Method	Minimum Permissible Value
Grab Tensile Strength (both directions)	ASTM D4632-2023	120 pounds
Grab Elongation	ASTM D4632-2023	50 percent
Mullen Burst Strength	ASTM D3786-2018	225 psi
CBR Puncture Strength	ASTM D3787-2020	340 pounds
Trapezoid Tear Strength	ASTM D4533-2015	50 pounds
Water Flow Rate	ASTM D4491-2022	120 gal/min/sf
Equivalent Opening Size (EOS)	ASTM D4751-2021	U.S. Std. Sieve #70
Coefficient of Permeability	ASTM D4491-2022	0.2 cm/sec

The geotextile shall have property values expressed in "typical" values that meet or exceed the values stated above as determined by the most recent test methods specified above.

B. Filter fabric for use in **reinforcement and under riprap** shall meet the requirements of Table 2. Woven and non-woven geotextiles are acceptable.

Table 2

Geotextile Mechanical Property	Test Method	Minimum Permissible Value
Grab Tensile Strength (both directions)	ASTM D4632-2023	160 pounds
Grab Elongation	ASTM D4632-2023	50 percent
Mullen Burst Strength	ASTM D3786-2018	305 psi
CBR Puncture Strength	ASTM D6241 -2020	410 pounds
Trapezoid Tear Strength	ASTM D4533-2015	60 pounds
Equivalent Opening Size (EOS)	ASTM D4751 -2021	U.S. Std. Sieve #70

The geotextile shall meet or exceed the "typical" values stated above as determined by the most recent test methods specified above.

C. Filter fabric for use **under the abutment structures** shall meet the requirements of **Table 3**. Woven and non-woven geotextiles are acceptable.

Table 2

Geotextile Mechanical Property	Test Method	Minimum Permissible Value
Grab Tensile Strength (both directions)	ASTM D4632-2023	315 pounds
Grab Elongation	ASTM D4632-2023	15 percent
Mullen Burst Strength	ASTM D3786-2018	340 psi
CBR Puncture Strength	ASTM D6241 -2020	900 pounds
Trapezoid Tear Strength	ASTM D4533-2015	120 pounds
Equivalent Opening Size (EOS)	ASTM D4751 -2021	U.S. Std. Sieve #40

The geotextile shall meet or exceed the "typical" values stated above as determined by the most recent test methods specified above.

Marifi Marifi 600X, US 315, or approved equal.

D. Filter Fabric for use in siltation fencing shall be the following:
   1. Environfence 100X (Mirafi)
   2. Supac 4NP (Phillip 66)
   3. Exxon 180 Siltfence
   4. Amoco 1380 Silt Stop
   5. Harris Siltfence
   6. Or equivalent

PART 3 - EXECUTION

3.1 Install filter fabric as shown on the drawings or as directed in appropriate specifications in this division or in accordance with manufacturer's instructions or as directed by the Engineer.

END OF DIVISION 334626

DIVISION 00
000810 NOTICE OF AWARD

Dated _____, 2025

TO: _____
(BIDDER)

ADDRESS: _____

_____

_____

PROJECT: **Reed Road Bridge Replacement Project**

OWNER's CONTRACT NO. **039-23**

CONTRACT FOR **Complete Construction Services for removal of existing bridge and replacement with a bridge structure, including, but not limited to, stream restoration, site work, and structural work.**

You are notified that your Bid, dated _____, 2025, for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a contract for all work, as described, or implied, by the **Reed Road Bridge Replacement Project Manual**, as issued **February 23, 2025**, and the project drawings titled **"Project Drawings for Reed Road over Quick Stream"**, as Revision 4 "Issued for Construction" and dated **February 11, 2025**.

_____

The Contract Price of your contract is:

_____ Dollars

and _____ Cents (**$** **US**).

3 Copies of the proposed agreement shall accompany this Notice of Award for execution (one copy will be returned to you after incorporation into a full set of Executed Documents).
3 Sets of Contract Drawings and Specifications will be delivered separately or otherwise made available to you for construction.

You must comply with the following conditions precedent within **7** days of the date of this Notice of Award, that is by _____, 2025.

1. You must deliver to the OWNER **3** fully executed counterparts of the Agreement.

2. You must deliver with the executed Agreement the Contract Security (Bonds) as specified in the Instructions to Bidders (paragraph 18), General Conditions (paragraph 5.1) and Supplementary Conditions (paragraph SC-5.1).

3. (List other conditions precedent).

You must deliver the project schedule, including critical paths and timelines, to the engineer and construction manager prior to mobilization.

Engineer shall require 48-hour notice to any inspections.

Failure to comply with these conditions within the time specified will entitle OWNER to consider your bid in default, to annul this Notice of Award and to declare your Bid Security forfeited.

Within seven days after you comply with the above conditions, OWNER will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

Inhabitants of Franklin County
(OWNER)

By: _____
(AUTHORIZED SIGNATURE)

_____
(PRINTED)

_____
(TITLE)

ACCEPTANCE OF AWARD

_____
(CONTRACTOR)

By: _____
(AUTHORIZED SIGNATURE)

_____
(PRINTED)

_____
(TITLE)

_____
(DATE)

END SECTION 000810 – NOTICE OF AWARD

DIVISION 00
000811 NOTICE TO PROCEED

Dated _____, 2025

TO: _____
(BIDDER)

ADDRESS: _____

_____

_____

PROJECT: **Reed Road Bridge Replacement Project**

OWNER's CONTRACT NO. **039-23**

CONTRACT FOR **Complete Construction Services for removal of existing bridge and replacement with a bridge structure, including, but not limited to, stream restoration, site work, and structural work.**

You are notified that the Contract Times under the above contract will commence to run on _____,2025. By that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement the dates of Substantial Completion and completion and readiness for final payment shall be **October 31, 2025**.

Before the start of any Work at the site, paragraph 2.7 of the General Conditions provides that you and the Owner must each deliver to the other (with copies to ENGINEER and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the site, you must:

You must deliver the project schedule, including critical paths and timelines, to the engineer and construction manager.

Inhabitants of Franklin County
(OWNER)

By: _____
(AUTHORIZED SIGNATURE)

_____
(PRINTED)

_____
(TITLE)

ACCEPTANCE OF NOTICE TO PROCEED

_____
(CONTRACTOR)

By: _____
(AUTHORIZED SIGNATURE)

_____
(PRINTED)

_____
(TITLE)

_____
(DATE)

END SECTION 000811 – NOTICE TO PROCEED

DIVISION 00
000815 INSURANCE

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:

1. The CONTRACTOR shall purchase and maintain, until Final Acceptance of the work, insurance of the limits and types stated in the General Conditions of the Construction Contract and as stated below, from an insurance company approved by the OWNER.

B. Evidence of Insurance:

1. As evidence of insurance coverage, the OWNER may, in lieu of actual policies, accept official written statements from the insurance company certifying that all the insurance policies specified below are in force for the specified period. The CONTRACTOR shall submit evidence of insurance to the OWNER at the time of executing the Agreement.

C. Form of Insurance:

1. Insurance shall be in such form as will protect the CONTRACTOR and OWNER from all claims and liabilities for damages for bodily injury, including accidental death, and for property damage, which may arise from operations under this contract, whether such operation be by himself or by anyone directly or indirectly employed by him.

D. Amount of Insurance:

1. Except when otherwise stated, the amount of insurance for each policy shall be not less than:
   a. Liability for bodily injury, including accidental death:
      (1) $1,000,000 for any one person.
      (2) $1,000,000 for each accident.
   b. Liability for Property Damage:
      (1) $1,000,000 for any accident.
      (2) $2,000,000 for all accidents.

E. Types of Insurance:

1. The CONTRACTOR shall purchase and maintain the following types of insurance:
   a. Full Workmen's Compensation insurance coverage for all persons employed by the CONTRACTOR to perform work on this project. This insurance shall be in strict accordance with the requirements of the most current laws of the State.
   b. Bodily Injury insurance and Contractor's Protective Property Damage insurance, each including coverage for blasting explosion, and injury to, or destruction of, wires, pipes, conduits and similar property, appurtenant apparatus, whether public or private and collapse of, or structural injury to, any building or structure, except those on which work under this Contract is being performed.
   c. Bodily Injury and Property Damage insurance covering the operation of all motor vehicles and equipment, whether or not owned by the CONTRACTOR, being operated

in connection with the prosecution of the work under this Contract.

d. Contractual Liability insurance coverage in the amounts specified above.
e. An Owner's Protective Liability insurance issued to the OWNER at the expense of the CONTRACTOR.
f. Fire insurance shall be included with all Property Damage insurance, either by clause or accompanying letter, in an amount equal to the total bid price of all structures subject to fire damage.

2. Builders "All Risk" insurance as outlined in paragraph 5.6 of the General Conditions with coverage extended to include the OWNER and ENGINEER. The amount shall be equal to or greater than the total bid price.

END SECTION 000815 – INSURANCE

DIVISION 00
000824 CHANGE ORDER

No._____

REED ROAD BRIDGE REPLACEMENT PROJECT

DATE OF ISSUANCE

OWNER **INHABITANTS OF FRANKLIN COUNTY**

OWNER's Contract o. Reed Road over Quick Stream, Salem Township, Maine

CONTRACTOR ENGINEER **Wentworth Partners & Associates, Inc.**

You are directed to make the following changes in the Contract Documents.

Description:

Reason for Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price $_____	Original Contract Times Substantial Completion: _____ Ready for final payment: _____ days or dates
Net changes from previous Change Orders No. ___ to No. _____ $ _____	Net change from previous Change Orders No. _____ to No. _____ _____ days
Contract Price prior to this Change Order $_____	Contract Times prior to this Change Order Substantial Completion: _____ Ready for final payment: _____ days or dates
Net Increase (decrease) of this Change Order $ _____	Net Increase (decrease) of this Change Order _____ days
Contract Price with all approved Change Orders	Contract Times with all approved Change Orders Substantial Completion: _____

$ _____	Ready for final payment: _____ days or dates

RECOMMENDED:	APPROVED:	ACCEPTED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

END SECTION 000824 - CHANGE ORDER

DIVISION 00

000830 CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: Inhabitants of Franklin County	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer: Wentworth Partners & Associates, Inc.	Engineer's Project No.: 039-23
Project: **Reed Road Bridge Replacement Project**	Contract Name: Effective Date of Contract:

This [preliminary] [final] Certificate of Substantial Completion applies to:

□ All Work □ The following specified portions of the Work:

_____

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all- inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor.]*

Amendments to Owner's responsibilities: □ None □ As follows
Amendments to Contractor's responsibilities: □ None □ As follows

The following documents are attached to and made a part of this Certificate: [punch list; others]

_____

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By:	By:	By: _____
(Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

END SECTION 000830 – SUBSTANTIAL COMPLETION

APPENDIX A
SAMPLE CONTRACT

CONSTRUCTION AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between: **Inhabitants of Franklin County** ("Owner") and **A-B-C contractor** ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 -WORK

1.1 Contractor shall complete all Work as specified in or implied by the Contract Documents. The Work is generally described as follows: **Reed Road Bridge Replacement Project** in **Salem Township, Franklin County, Maine.**

ARTICLE 2 – THE PROJECT

2.1 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

This project requires the removal and replacement of the existing bridge structure over the Quick Stream. The on-Site construction process will include, but not be limited to, mobilization, establishment of a second means of access*, installation of the sediment control barriers and buffers, removal of the existing superstructure, removal of the existing substructures, excavation for and installation of the new abutments, reconstruction of the stream banks at the abutments, restoration of the stream bed up- and downstream, installation of the abutment armament, installation of the bridge superstructure, regrading the road and shoulders, reseeding all other areas, removal of the sediment control barriers and buffers, then cleanup and demobilization. The on-Site construction period will require three to four months. All in-stream work will occur between July 15th and September 30th. All in-water work will occur during the in-water work window. Silt fencing will used in all areas where sediment transport would move toward the stream. Adequate sediment controls shall be installed and maintained throughout the construction process per MDEP BMP. All sediment collected will be relocated to a nearby spent gravel pit. Floating silt fence will be used along the stream edges. NO equipment shall be used in the water. Contractor will observe the Spill Prevention Control & Countermeasures to protect the stream. No refueling will occur within 250 feet of the stream. Loam, seed, and/or mulch will be placed immediately after construction is complete. The contractor shall be MDEP certified for erosion and sediment control practice.

Presently there are five properties of concern located to the south of the bridge crossing. Each property presents a different problem to resolve. Two of the homes, both on the eastern side of Reed Road, are occupied full time. One of the properties at the end of the road has two camps on it. These are only occasionally visited. There is a logging outfit located on the western side of Reed Road. And, lastly, there are the horse pastures and hay fields located on the eastern side that belong to the farmer who lives immediately to the north of the stream crossing. In numerous conversations with the County Administrator, it would seem that the best option shall be presented as a relocation stipend to each owner for the duration of the substantial work. This shall be quantified as the following;

The contractor shall include in their final bid amount a relocation stipend for $30,000.00. This shall be applied as follows: Each resident shall receive a $1,500.00 per week room and board stipend for four weeks during the most critical construction period.

The contractor shall also add the cost to supply (1) 2000-gallon minimum water tanker, with pump, to remain on the south side of the crossing during construction. The contractor shall also supply (1) two-passenger side-by-side with a stretcher basket for use by emergency services. The contractor will be responsible to start and run each vehicle at the beginning and end of each day. Each vehicle shall be ready to go, at all times, in the case of an emergency. A Knox Box will be placed on site near the vehicles and keys to the vehicles shall be placed inside for 24-hour access by emergency services.

A second four-passenger side-by-side shall be made available for the local residences during working hours only. This will be a shared vehicle. Additionally, a secured location shall be set aside for the local residents to leave their own UTV vehicles near the crossing. A pedestrian bridge over the stream shall be provided for non-impaired (no ADA requirements) individuals during the time of construction. A clear path, with no foot obstructions, to and from the pedestrian bridge to the road shall be required and maintained until the new crossing is in place and passable.

ARTICLE 3 – ENGINEER

3.0 The **Reed Road Bridge Replacement Project** has been designed by Wentworth Partners & Associates, Inc. Wentworth Partners & Associates shall act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer, as described the Contract Documents, in connection with the completion of the Work in accordance with said Contract Documents.

ARTICLE 4 – CONSTRUCTION MANAGER

4.0 The **Reed Road Bridge Replacement Project** shall have general oversite. Wentworth Partners & Associates, Inc., represented by Mr. Steven C. Govoni, Engineer-of-Record, and Mr. George Bell, Construction Manager, shall be responsible for general project management as well as structural, civil, and stream restoration oversite. WPA is acting in tandem to the Owner, and therefore assumes all duties and responsibilities thereof, including the rights

and authority assigned by the Owner in connection with the completion of the Work in accordance with the Contract Documents.

Additionally, Franklin County shall be represented by the UT Road Supervisor, Mr. Robert Lightbody, P.E. Mr. Lightbody shall assume all duties and responsibilities thereof, including the rights and authority assigned by the Owner.

ARTICLE 5 - CONTRACT TIMES

5.1 Time of the Essence

All time limits for milestones, including In-stream work, Substantial Completion, and completion and readiness for final payment, as stated in the Contract Documents, are of the essence for the Contract.

5.2 Dates for Substantial Completion and Final Payment

The Work will be substantially completed and ready for final payment on or before **October 31, 2025**.

ARTICLE 6 – CONTRACT PRICE

6.0 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, as stated in Article 7.

ARTICLE 7 – PAYMENT PROCEDURES

7.1 Submittal and Processing of Payments

Contractor shall submit Applications for Payment on a monthly basis. Applications for Payment will be processed by Engineer.

7.2 Process Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the last day of each month, after approval of the payment request and amount by the Engineer as provided in paragraph 7.2.A.1 below.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine unwarranted or the Owner may withhold.

a. 90 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

b. 90 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 98 percent of the Work completed, less 150 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

7.3 Final Payment

Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price as recommended by Engineer.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.1 Representations

In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified.

E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) The cost, progress, and performance of the Work; (2) The means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 8.1.E above, Contractor does not consider that further examinations, investigations, explorations,

tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.1 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages **CA1** to **CA24**, inclusive).

2. Project plans, so named:

Project Drawings for Reed Road over Bog Brook
Revision 4 Issued for Construction
Dated February 11, 2025;
and consisting of 29 sheets listed as:

General Sheets	G001 through G006
Civil Sheets	C001, C002, C101 through C113
Structural Sheets	S001, S002, and S101 through S106

3. Geotechnical Report

4. Exhibits to this Agreement (enumerated as follows):
000000 Project Contract
000400 Summary of Work
000700 Specifications, including Maine DOT Standard Specification (March 2020)
000810 Notice Of Award
000811 Notice To Proceed

5. Addenda

B. The documents listed in Paragraph 9.1.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as mutually agreed.

ARTICLE 10 – GENERAL PROVISIONS

10.1 The Contract Documents

The Contract Documents consist of this Agreement with Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order; (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Engineer. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

10.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties, hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Engineer and Contractor, (2) between the Owner and a Subcontractor or sub-subcontractor, (3) between the Owner and Engineer or (4) between any persons or entities other than the Owner and Contractor.

10.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

10.4 Execution of the Contract

Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

10.5 Ownership and Use of Engineer's Drawings, Specifications and Other Instruments of Service

The Drawings, Specifications and other documents, including those in electronic form, prepared by the Engineer and the Engineer's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Engineer or the Engineer's consultants, and unless otherwise indicated the Engineer and the Engineer's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved fights, in addition to the copyrights. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Engineer, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Engineer and the Engineer's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, sub- subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Engineer and the Engineer's consultants. The Contractor, Subcontractors, sub- subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Engineer and the Engineer's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and .other documents prepared by the Engineer and the Engineer's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Engineer's or Engineer's consultants' copyrights or other reserved rights.

ARTICLE 11 – OWNER

11.1 Information and Services Required of the Owner

11.1.1 The Owner shall furnish and pay for surveys and a legal description of the site.

11.1.2 The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

11.1.3 Except for fees, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for other necessary permits, approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or permanent changes in existing facilities.

11.2 Owners Right to Stop the Work

If the Contractor fails to correct Work which is not in accordance with the requirements

of the Contract Documents or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

11.3 Owner's Right to Carry Out the Work

If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents, or fails to perform a provision of the Contract, the Owner, after 10 days' written notice to the Contractor and without prejudice to any other remedy the Owner may have, may make good such deficiencies and may deduct the reasonable cost thereof, including Owner's expenses and compensation for the Engineer's services made necessary thereby, from the payment then or thereafter due the Contractor.

ARTICLE 12 – CONTRACTOR

12.1 Review of Contract Documents and Field Conditions by Contractor

12.1.1 Since the Contract Documents are complementary, before starting, each portion of the Work, the Contractor shall carefully study and compare the various. Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Subparagraph 11.1.1, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions or inconsistencies in the Contract Documents; however, any errors, omissions or inconsistencies discovered by the Contractor shall be reported promptly to the Engineer as a request for information in such form as the Engineer may require.

12.1.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Engineer, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

12.2 Supervision and Construction Procedures

12.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall be fully and solely

responsible for the jobsite safety thereof unless the Contractor gives timely written notice to the Owner and Engineer that such means, methods, techniques, sequences or procedures may not be safe.

12.2.2 The Contractor Shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

12.3 Labor and Materials

12.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

12.3.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

12.3.3 The Contractor shall deliver, handle, store and install materials in accordance with manufacturers' instructions.

12.3.4 The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Engineer and in accordance with an approved Change Order.

12.4 Warranty

The Contractor warrants to the Owner and Engineer that materials and equipment furnished under the Contract will be of good quality and new, unless otherwise required or permitted by the Contract Documents, and that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse by someone other than the Contractor, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear from normal usage.

12.5 Taxes

The project is **exempt** from any applicable local, state, or federal taxes.

12.5.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work.

12.5.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work. The Contractor shall promptly notify the Engineer and Owner if the Drawings and Specifications are observed by the Contractor to be at variance therewith. If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Engineer and Owner, the Contractor shall assume appropriate responsibility for such Work and shall, bear the costs attributable to correction.

12.6 Submittals

12.6.1 The Contractor shall review for compliance with the Contract Documents, approve in writing and submit to the Engineer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness. The Work shall be in accordance with approved submittals.

12.6.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

12.7 Use of Site

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

12.8 Cutting and Patching

The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

12.9 Cleaning Up

The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus material. **Cigarettes, cigars, vaping pens, etc. are considered trash** and shall be disposed of properly accordingly. The project Site shall be clear of debris and clean of any trash at the end of each day. No trash or debris shall be permitted in the stream at any time.

12.10 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees; shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Engineer harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or

manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Engineer, unless the Contractor has reason to believe that there is an infringement of patent or copyright and fails to promptly furnish such information to the Engineer.

12.11 Access to Work

The Contractor shall provide the Owner and Engineer access to the Work in preparation and progress wherever located.

12.12 Indemnification

12.12.1 To the fullest extent permitted by law, and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance, purchased by the Contractor in accordance with ARTICLE 20, the Contractor shall indemnify and hold harmless the Owner, Engineer, Engineer's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including, but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 12.12.

12.12.2 In claims against any person or entity indemnified under this Paragraph 12.12 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Subparagraph 12.12.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 13 – ENGINEER'S ADMINISTRATION OF THE CONTRACT

13.1 The Engineer will provide administration of the Contract and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Paragraph 21.2.

13.2 The Engineer, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the

Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Engineer will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or] procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Subparagraph 12.2.1.

13.3 The Engineer will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Engineer will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

13.4 Based on the Engineer's evaluations of the Work and of the Contractor's Applications for Payment, the Engineer will review, and certify, the amounts due the Contractor and will issue Certificates for Payment in such amounts

13.5 The Engineer will have authority to reject Work that does not conform to the Contract Documents.

13.6 The Engineer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

13.7 The Engineer will interpret and decide matters concerning performance under requirements of, the Contract Documents on written request of either the Owner or Contractor. The Engineer will make initial decisions on all claims, disputes and other matters in question between the Owner and Contractor but will not be liable for results of any interpretations or decisions so rendered in good faith.

13.8 Duties, responsibilities and limitations of authority of the Engineer as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Engineer. Consent shall not be unreasonably withheld.

13.9 Exempt

13.10 Claims and Disputes

13.10.1 Claims, disputes and other matters in question arising out of or relating to this Contract, including those alleging an error or omission by the Engineer but excluding those arising under Paragraph 19.2, shall be referred initially to the Engineer for

decision. Such matters shall, after initial decision by the Engineer or 30 days after submission of the matter to the Engineer, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

13.10.2 If a claim, dispute or other matter in question relates to or is the subject of a mechanic's lien, the party asserting such matter may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the matter by the Engineer, by mediation or by arbitration.

13.10.3 The parties shall endeavor to resolve their disputes by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to this Agreement and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

13.10.4 Claims, disputes and other matters in question arising out of or relating to the Contract that are not resolved by mediation, except those waived as provided for in Paragraph 13.11 and Subparagraphs 18.5.3 and 18.5.4, shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to this Agreement and with the American Arbitration Association and shall be made within a reasonable time after the dispute has arisen. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof. Except by written consent of the person or entity sought to be joined, no arbitration arising out of or relating to the Contract Documents shall include, by consolidation, joinder or in any other manner, any person or entity not a party to the Agreement under which such arbitration arises, unless it is shown at the time the demand for arbitration is filed that (1) such person or entity is substantially involved in a common question of fact or law, (2) the presence of such person or entity is required if complete relief is to be accorded in the arbitration, (3) the interest or responsibility of such person or entity in the matter is not insubstantial and (4) such person or entity is not the Engineer or any of the Engineers employees or consultants. The agreement herein among the parties to the Agreement and any other written agreement to arbitrate referred to herein shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

13.11 Claims for Consequential Damages

The Contractor and Owner waive claims against each other for consequential damages

arising out of or relating to this Contract. This mutual waiver includes:

13.11.1 Damages incurred by the Owner for rental expenses for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

13.11.2 Damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 19. Nothing contained in this Paragraph shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

ARTICLE 14 – SUBCONTRACTORS

14.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site.

14.2 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Engineer the names of the Subcontractors for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor to whom the Owner or Engineer has made reasonable and freely objection within fifteen days. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

14.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Engineer, and (2) allow the Subcontractor the benefit of all rights, remedies and redress afforded to the Contractor by these Contract Documents.

ARTICLE 15 – OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

15.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under

conditions of the contract identical or substantially similar to these, including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such claim as provided in Paragraph 13.10.

15.2 The Contractor shall afford the Owner and separate contractors' reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's activities with theirs as required by the Contract Documents.

15.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

ARTICLE 16 – CHANGES IN THE WORK

16.1 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor and Engineer, or by written Construction Change Directive signed by the owner and Engineer.

16.2 The cost or credit to the Owner from a change in the Work shall be determined by mutual agreement of the parties or by unit prices or, in the case of a Construction Change Directive, by the Contractor's cost of labor, material, equipment, and reasonable overhead and profit.

16.3 The Engineer will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be affected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

16.4 If concealed, or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be equitably adjusted.

ARTICLE 17 – TIME

17.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

17.2 The date of Substantial Completion is the date certified by the Engineer in accordance with Subparagraph 18.4.2.

17.3 If the Contractor is delayed at any time in the commencement or progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties or any causes beyond the Contractor's control, or by other causes which the Engineer determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Engineer may determine, subject to the provisions of Paragraph 13.10.

ARTICLE 18 – PAYMENTS AND COMPLETION

18.1 Applications for Payment

18.1.1 Payments shall be made as provided in Article 6 and Article 7 of this Agreement. Applications for Payment shall be American Institute of Architects [AIA] Documents G702 Application and Certification For Payment and G703 Continuation Sheet; or in another form satisfactory to the Engineer.

18.1.2 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

18.2 Certificates for Payment

18.2.1 The Engineer will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Engineer determines is properly due, or notify the Contractor and Owner in writing of the Engineer's reasons for withholding certification in whole or in part as provided in **Subparagraph 18.2.3**.

18.2.2 The issuance of a Certificate for Payment will constitute a representation by the Engineer to the Owner, based on the Engineer's evaluations of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Engineer's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract documents prior to the completion and to specific qualifications expressed by the Engineer. The issuance of a Certificate of Payment will further constitute a representation that the Contractor is

entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Engineer has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the contractor has used money previously paid on account of the Contract Sum.

18.2.3 The Engineer may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the owner, if in the Engineer's opinion the representations to the Owner required by Subparagraph 18.2.2 cannot be made. If the Engineer is unable to certify payment in the amount of the Application, the Engineer will notify the Contractor and Owner as provided in Subparagraph 18.2. The Engineer may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Engineer's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Subparagraph 8.2.2, because of:

18.2.3.1 defective Work not remedied;

18.2.3.2 third party claims filed or reasonable evidence indicating probably filing of such claims unless security acceptable to the Owner is provided by the Contractor;

18.2.3.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

18.2.3.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

18.2.3.5 damage to the Owner or another contractor;

18.2.3.6 reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

18.2.3.7 persistent failure to carry out the Work in accordance with the Contract Documents.

18.2.4 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

18.3 Payments to the Contractor

18.3.1 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such

Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in similar manner.

18.3.2 Neither the Owner nor Engineer shall have an obligation to pay or see to the payment of money to a Subcontractor except as may otherwise be required by law.

18.3.3 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

184 Substantial Completion

18.4.1 Substantial Completion is the stage in the progress of the Work when the Work, or a designated portion thereof, is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

18.4.2 When the Engineer determines that the Work or designated portion thereof is substantially complete, the Engineer will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion, establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate, Warranties required by the Contractor Documents shall commence on the date of Substantial Completion of the work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. Upon the issuance of the Certificate of Substantial Completion, the Engineer will submit it to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

18.5 Final Completion and Final Payment

18.5.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final application for Payment, the Engineer will promptly make such inspection and, when the Engineer finds the Work acceptable under the Contact Documents and .the Contract fully performed, the Engineer will promptly issue a final Certificate for Payment slating that to the best of the Engineer's knowledge, information and belief, and on the basis of the Engineer's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Engineer's final Certificate for Payment will constitute a further representation that conditions stated in Subparagraph 18.5.2 as precedent to the Contractor's being entitled to final payment have been Fulfilled.

18.5.2 Final payment shall not become due until the Contractor has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

18.5.3 The making of final payment shall constitute a waiver of claims by the Owner except those arising from:

18.5.3.1 lien, claims, security interests or encumbrances arising out of the Contract and unsettled;

18.5.3.2 failure of the Work to comply with the requirements of the Contract Documents; or

18.5.3.3 terms of special warranties required by the Contract Documents.

18.5.4 Acceptance of final payment by the Contractor a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and indemnified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 19 – PROTECTION OF PERSONS AND PROPERTY

19.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall, take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

19.1.1 employees on the Work and other persons who may be affected thereby;

19.1.2 the Work and materials and equipment to be incorporated therein; and

19.1.3 other property at the site or adjacent thereto.

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Subparagraphs 19.1.2 and 19.1.3, except For damage or loss attributable to acts or omissions of the Owner or Engineer or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 12.13.

19.2 Hazardous Materials

19.2.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Engineer in writing. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay and start-up, which adjustments shall be accomplished as provided in Article 16 of this Agreement.

19.2.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Engineer, Engineer's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Subparagraph 19.2.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or injury to or destruction of tangible property, (other than the work itself), and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

19.2.3 If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of mediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

ARTICLE 20 – INSURANCE

20.1 The Contractor shall purchase from and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, insurance for protection from claims under workers' compensation acts and other employee benefit acts which are applicable, claims for damages because of bodily injury, including death, and claims for damages, other than to the Work itself, to property which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by the Contractor or by a Subcontractor or anyone directly or indirectly employed by any of them. This insurance shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater, and shall include contractual liability insurance applicable to the Contractor's obligations. Certificates of Insurance acceptable to the Owner shall be filed, with the Owner prior to commencement of the Work. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days' prior written

notice has been given to the Owner.

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

20.2 Property Insurance

20.2.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance on an "all-risk" policy form, including builder's risk, in the initial Contract Sum plus the value of subsequent modifications and cost of materials supplied and installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 18.5 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and sub-subcontractors in the Project.

20.2.2 The Owner shall file a copy of each policy with the Contractor before an exposure to loss may occur. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

20.3 Waivers of Subrogation

20.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Engineer, Engineers' consultants, separate contractors described in Article 15, if any, and any of their subcontractors, sub-contractors, agents and employees for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to Paragraph 20.2 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contactor, as appropriate, shall require of the Engineer, Engineer's consultants, separate contractors described in Article 15, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly and whether or not the person or entity has an insurable interest in the property damaged.

20.3.2 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insured, as their interests may appear, subject to requirements of any applicable mortgagee clause. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their sub-subcontractors I similar manner.

ARTICLE 21 – CORRECTION OF WORK

21.1 The Contractor shall promptly correct Work rejected by the Engineer or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial" Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

21.2 In addition to the Contractor's obligations under Paragraph 12.4, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Subparagraph 22.4.2, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one- year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.

21.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 11.3.

21.4 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

21.5 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 21.

ARTICLE 22 – MISCELLANEOUS PROVISIONS.

22.1 Assignment of Contract

Neither party to the Contract shall assign the Contract without written consent of the other.

22.2 Governing Law

This Contract, once ratified, including the validity, interpretation, construction and performance thereof, shall be governed by and construed in accordance with the substantive laws of the State of Maine. Jurisdiction for resolution of any disputes shall be solely in Franklin County of the State of Maine.

22.3 Tests and Inspections

Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner. or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Engineer timely notice of when and where tests and inspections are to be made so that the Engineer may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

22.4 Commencement of Statutory Limitation Period

As between Owner and Contractor, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued:

22.4.1 not later than the date of Substantial Completion for acts or failures to act occurring prior to the relevant date of Substantial Completion;

22.4.2 not later than the date of issuance of the final Certificate for Payment for acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to the issuance of the final Certificate for Payment; and

22.4.3 not later than the date of the relevant act or failure to act by the Contractor for acts or failures to act occurring after the date of the final Certificate for Payment.

ARTICLE 23 – TERMINATION OF THE CONTRACT

23.1 Termination by the Contractor

If the Engineer fails to recommend payment for a period of 30 days through no fault of the Contractor, or if the Owner fails to make payment thereon for a period of 90 days, the Contractor may, upon seven additional days' written notice to the Owner and the Engineer, terminate the Contract and recover from the owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages applicable to the Project.

23.2 Termination by the Owner

23.2.1 The Owner may terminate the Contract if the Contractor:

23.2.1.1 persistently or repeatedly refuses or fails to supply enough properly

skilled workers or proper materials;

23.2.1.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

23.2.1.3 persistently disregards laws, ordinances, or rules, regulations or orders from a public authority having jurisdiction; or

23.2.1.4 otherwise, is guilty of substantial breach of a provision of the Contract Documents.

23.2.2 When any of the above reasons exists, the Owner, upon certification by the Engineer that sufficient cause exists to justify such action may, without prejudice to any other remedy the Owner may have and after giving the Contractor seven days' written notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor the owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

23.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 23.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

23.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Engineer's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Engineer, upon application, and this obligation for payment shall survive termination of the Contract.

ARTICLE 24 – OTHER CONDITIONS OR PROVISIONS

24.1 The Owner shall withhold 5% of the money due to Contractor until the work under the Contract has been accepted by or for the Owner. The Owner may, upon the completion of part or parts of the contract and with the approval of the General Contractor and Designer, pay all or part of the retainage on those parts completed as the Owner deems prudent, provided satisfactory release of lien has been provided.

24.2 Liability Insurance shall be carried with the Franklin County and Wentworth Partners & Associates listed as additionally insured for the following limits:

General Liability	$2,000,000
Each occurrence	$1,000,000
Automobile Liability	$1,000,000

Workers Compensation As prescribed by Law

The Insurance Certificate shall stipulate that a per project endorsement applies.

24.3 "Reasonable overhead and profit", as described in Article 16, shall mean an allowance to be added to or subtracted from the "cost" in lieu of overhead and profit and of any other expense which is not included in the cost of the Work covered by the change. Percentage for a Contractor shall be 15% of any net increase or decrease of Cost of any Work performed by his own forces and 10% for Work performed by any Subcontractors.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on_____(which is the Effective Date of the Agreement).

OWNER: **Inhabitants of Franklin County**	CONTRACTOR:
By: _____	By: _____
By:_____	By:_____
By:_____	By: _____
Title: **County Administrator**	Title: **President**

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:	Attest:
_____	_____
_____	_____
Title: _____	Title: _____
_____	_____

APPENDIX B
CONTRACT DOCUMENT

APPENDIX C
GEOTECHNICAL REPORT

REPORT

23-0434

June 23, 2023

Explorations and Geotechnical Engineering Services

Luce Bridge #0386 Replacement
Reed Road over Quick Stream
Salem Township, Maine

Prepared For:
Wentworth Partners & Associates
Attention: Steven Govoni, P.E.
31 Commercial Street / P.O. Box 2285
Skowhegan, ME 04976

Prepared By:
S. W. Cole Engineering, Inc.
26 Coles Crossing Drive
Sidney, ME 04330
T: 207.626.0600

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23-0434

June 23, 2022

Wentworth Partners & Associates
Attention: Steven Govoni, P.E.
31 Commercial Street / P.O. Box 2285
Skowhegan, ME 04976

Subject: Explorations and Geotechnical Engineering Services
Hopkins Bridge Replacement
Blake Hill Road over Hopkins Stream
Mount Vernon, Maine

Dear Steve:

In accordance with our Proposal dated March 28, 2023, we have performed subsurface explorations for the subject project. This report summarizes our findings and geotechnical recommendations, and its contents are subject to the limitations set forth in Appendix A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to explore subsurface conditions at the site and provide geotechnical recommendations for the proposed bridge replacement. Our scope of services included two test boring explorations, soils laboratory testing, a geotechnical evaluation of the findings relative to proposed construction, and preparation of this report.

1.2 Site and Proposed Construction

The site is located on Reed Road at the crossing of Quick Stream in Salem Township, Maine. Based on information for the Maine Public Bridge Inventory, we understand the existing crossing was constructed in 2000 and consists of ±49.2 foot-long by ±22-foot-wide, single-span bridge. Details regarding the existing substructure are not available.

However, we understand the bridge has a substructure rating of “fair” and the stream channel has minor stream bank damage.

We understand project planning includes replacing the existing structure with a ±60 to 65-foot single-span bridge founded on spread footing foundations. We anticipate the superstructure will consist of steel beam girders with a reinforced concrete deck. We understand the replacement structure will be constructed on the existing alignment and the vertical grade will be raised slightly (less than 1 foot). We understand the existing structure will be removed.

Existing site features are shown on the “Exploration Location Plan” attached in Appendix B.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Two test borings (B-1 and B-2) were made at the site on May 18 and 19, 2023, by S. W. Cole Explorations, LLC. The explorations were selected and established in the field by S. W. Cole Engineering, Inc. (S.W.COLE) using taped measurements from existing site features based on guidance from Wentworth Partners & Associates. The approximate exploration locations are shown on the “Exploration Location Plan” attached in Appendix B. Logs of the explorations and a key to the notes and symbols used on the logs are attached in Appendix C.

2.2 Field Testing

The test borings were drilled using a combination of solid-stem auger and cased rotary-wash drilling techniques. The soils were sampled at approximate 5-foot intervals using a split-spoon sampler and Standard Penetration Testing (SPT) methods using a calibrated automatic hammer. SPT blow counts are shown on the logs in Appendix C.

2.2 Laboratory Testing

Soil samples obtained from the explorations were returned to our laboratory for further classification and testing. Laboratory testing included six water content tests and six gradation analyses. Moisture contents are shown on the boring logs in Appendix C. Results of the gradations are provided in Appendix D.

3.0 SUBSURFACE CONDITIONS

3.1 Surficial and Bedrock Geology

According to the Maine Geological Survey's (MGS's) Surficial Geologic Mapping of the Phillips Quadrangle, Maine (Open-File Map 75-13)[1], surficial geologic units within the site vicinity consist of glacial stream deposits (sand and gravel) that may include minor amounts of glacial till and swamp and tidal marsh deposits (peat, silt, clay, and sand) overlying glacial till and bedrock with depth. The surficial geologic units encountered were generally consistent with the mapped geology; however, swamp and marsh deposits were not encountered in our explorations.

3.2 Soil and Bedrock

The subsurface conditions at the proposed abutment locations were explored by drilling two test borings. Borings B-1 and B-2 were drilled behind the existing south and north abutments, respectively. The test borings encountered a subsurface profile generally consisting of granular fill overlying glacial stream deposits. The principal strata encountered in the explorations are summarized below.

Fill: Test borings B-1 and B-2 were made within the existing gravel-surfaced roadway and encountered fill extending to depths of about 5.5 to 8 feet. The fill generally consisted of loose to dense sand with varying amounts of gravel and silt with occasional cobbles. Scattered surficial organics were encountered in boring B-2.

Glacial Stream Deposits: Underlying the fill, the explorations encountered glacial stream deposits consisting of an upper layer of medium dense to dense, sand and gravel with varying amounts of silt to a depth of about 20 to 31 feet overlying a loose to medium dense, silty sand with trace gravel. Borings B-1 and B-2 were terminated in the glacial stream deposit at depths of 57 and 80 feet, respectively.

3.2 Groundwater

Free water was encountered at depths ranging from 7 to 7.5 feet in the test borings at the time of exploration work. Long term groundwater information is not available. It should be anticipated that groundwater levels will fluctuate, particularly in response to periods of snowmelt and precipitation, changes in site use and the water level of Quick Stream.

[1] Caldwell, Dabney W., 1975, Reconnaissance surficial geology of the Phillips quadrangle, Maine: Maine Geological Survey, Open-File Map 75-13, scale 1:62,500.

4.0 FOUNDATION EVALUATION AND RECOMMENDATIONS

S.W.COLE conducted geotechnical engineering evaluations in accordance with 2020 AASHTO LRFD Bridge Design Specifications, 9th Edition (AASHTO) and the MaineDOT Bridge Design Guide, 2003 Edition with revisions through June 2018 (MaineDOT BDG).

4.1 Foundation Options and Discussion

We understand cast in place abutments supported on spread footing foundations is the preferred foundation option. The site is generally underlain by medium dense sand fill to about 6 to 9 feet overlying medium dense to dense sand and gravel with silt, cobbles and small boulders to a depth of about 20 to 31 feet overlying loose to medium dense, silty sand with trace gravel. Groundwater appears to generally follow the water level in Quick Stream.

We anticipate the spread footing foundations will extend below the thalweg (lowest point) of the stream and be protected from scour with riprap. Based on the anticipated foundation depth, foundations will extend below water requiring the need for increased excavation and dewatering efforts. We anticipate interlocking sheet piles may be needed to aid in providing groundwater cut-off.

We anticipate the proposed abutment foundations will be founded within the medium dense to dense sand and gravel with silt, cobbles, and small boulders (glacial stream deposits). We recommend the abutment footings be founded on a 6-inch layer of Crushed Stone overlying native medium dense to dense glacial stream deposits. The purpose of the Crushed Stone layer is to create a level and stable working mat and provide a media to sump and pump during construction.

4.2 Seismic Design Considerations

4.2.1 Bedrock Acceleration and Site Response

Seismic site class was evaluated in accordance with LRFD Article 3.10.3.1 Method B (average N-value method). Based on the subsurface information, the average N-value was between 15 and 50 blows per foot corresponding to an AASHTO Site Class D as defined in LRFD Table 3.10.3.1-1.

The United States Geological Survey (USGS) Seismic Design Parameters program (Version 2.1) was used to obtain the seismic design parameters for the site. Based on the assigned site class (AASHTO Site Class D) and site coordinates, the software provides

the recommended AASHTO Response Spectrum for a 7 percent probability of exceedance in 75 years (1,000-year return period). The results for the project site are summarized below.

RECOMMENDED SEISMIC DESIGN PARAMETERS	
Site Class	D
PGA	0.076 g
S_s	0.163 g
S_1	0.049 g
F_{pga}	1.6
F_a	1.6
F_v	2.4
A_s	0.12 g
S_{DS}	0.26 g
S_{D1}	0.12 g
Seismic Zone (based on S_{D1})	Zone 1

NOTE: Site Coordinates: N44.892199, W70.274054

Per AASHTO Article 4.7.4, single span bridges are not required to be analyzed for seismic loads, however the requirements of AASHTO Articles 4.7.4.4 and 3.10.9 shall apply.

4.2.2 Liquefaction Assessment

Liquefaction is typically observed in saturated deposits of loose, clean sands and non-plastic silts subjected to ground shaking most commonly from earthquakes. The foundation soils at the proposed bridge abutments are anticipated to consist of native medium dense to dense sand and gravel with varying amounts of silt overlying loose to medium dense silty sand. Based on the site soils, we anticipate the risk of seismically induced liquefaction below the foundations is low.

4.3 Frost Depth

The 100-year design freezing index (DFI) for the Salem Township, Maine area is approximately 2,000 Fahrenheit degree-days. Considering the DFI and site soils, we recommend the soils supported foundations for the abutments and wing walls have at least 6.5 feet of soil cover to provide frost protection. Riprap for scour protection should not be considered as part of the soil cover.

4.4 Foundation Design

We understand the proposed bridge will likely be founded on native medium dense to dense, sand and gravel with silt and cobbles (glacial stream deposits). We anticipate

the footings will be founded below water. We recommend footings on soil be supported on at least 6 inches of compacted Crushed Stone overlying properly prepared subgrade soils. Based on the subsurface conditions and our understanding of the proposed construction, we recommend the following foundation design parameters.

FOUNDATION DESIGN PARAMETERS FOR FOOTING ON SOIL			
Limit State	**Bearing Resistance Factor φ_b**	**Factored Bearing Resistance (ksf)**	**LRFD Reference**
Service	1.0	4.0	Table 10.6.2.5.1-1
Strength	0.45	4.1	Table 10.5.5.2.2-1
Extreme	1.0	9.2	Article 10.5.5.3

Footings should be at least 8 feet in width, regardless of the bearing pressure. In no instance shall the factored bearing stress exceed the factored compressive resistance of the footing concrete, which may be taken as $0.3f'_c$. S.W.COLE should be given the opportunity to review the proposed foundation layout during final design to adjust our recommendations based on the actual proposed foundation configuration and dimensions.

It is anticipated that use of spread footings will require a deeper foundation embedment than frost depth for scour protection, increasing efforts associated with excavation and dewatering. It will be important to properly dewater excavations to allow for observation and preparation of the bearing surface.

4.5 Abutments and Wingwalls

We anticipate the abutments and wingwalls will be backfilled with free-draining, MaineDOT Granular Borrow (703.19 Material for Underwater Backfill) resulting in a drained condition (i.e., no hydrostatic pressure) within the wall backfill. Based on the use of a free-draining, granular material, we recommend design consider the following parameters:

GEOTECHNICAL PARAMETERS FOR ABUTMENT AND WING WALLS	
Total Unit Weight of Backfill (γ_t)	125 pcf
Internal Friction Angle of Backfill (NHDOT Granular Backfill Item 209)	32°
Active Lateral Earth Pressure Coefficient (K_a)	0.3
At-Rest Lateral Earth Pressure Coefficient (K_o)	0.5
Passive Lateral Earth Pressure (K_p)	3.3

AASHTO recommends that live load surcharge be applied as a uniform lateral surcharge pressure using an equivalent fill height. Recommendations for equivalent lateral surcharge height are provided in AASHTO Article 3.11.6.4 based on wall height and distance from the wall back face to the edge of traffic.

4.6 Excavation and Dewatering Considerations

The excavations to foundation subgrade will generally encounter granular fills and medium dense to dense sand and gravel with silt, cobbles, and small boulders. Cobbles and boulders should be anticipated in the subsurface. Excavations should be dewatered during excavation, foundation construction, and backfilling to a depth greater than 1-foot below the bottom of excavation. Depressions or voids resulting from the removal of cobbles or boulders at subgrade should be backfilled with additional Crushed Stone. Foundations should be underlain with a minimum 12 inches of Crushed Stone (MaineDOT 703.13 Crushed Stone ¾-inch). This will help provide a stable surface from which to construct forms and provide a media from which to sump and pump groundwater.

Excavations may need interlocking sheet piles to assist water cut-off and help control groundwater within excavations. Controlling the water levels to at least one foot below planned excavation depths will help stabilize subgrades during construction. Surface water should be diverted from entering the foundation excavation.

Excavations must be properly shored and/or sloped to prevent sloughing and caving of the sidewalls during construction. All excavations should be performed in accordance with OSHA requirements. The contractor is responsible for developing an appropriate dewatering/excavation plan to install the foundations and maintain a stable subgrade.

4.7 Backfill and Compaction

Backfill within 10 feet of the abutments, wing walls, and side slope fill should consist of clean, non-frost susceptible sand and gravel meeting the gradation requirements for MaineDOT 703.19 “Granular Borrow for Underwater Backfill.”

Fill should be placed in horizontal lifts and be compacted. Lift thickness should be limited to that which can be thoroughly compacted using small, hand operated compaction equipment to avoid over compaction of material within 3 feet of the walls of the structure. We recommend fill against the proposed structure and wing walls be

compacted to between 95 to 98 percent of its maximum dry density as determined by AASHTO T-99.

If foundation construction takes place during cold weather conditions, subgrades and foundations must be protected from freezing conditions.

4.8 Design Review and Construction Testing

We recommend S.W.COLE be provided the opportunity to review recommendations in this report and make modifications as necessary once the final design for the replacement structure has been determined. S.W.COLE should be retained to review the final design and specifications to determine that our earthwork and foundation recommendations have been properly interpreted and implemented.

Further, we recommend S.W.COLE be retained to provide soils engineering and testing services during the excavation and foundation phases of the work. This is to observe compliance with the design concepts, specifications, and design recommendations and to allow design changes if subsurface conditions are found to differ from those anticipated prior to the start of construction. S.W.COLE is available to provide testing of soil, concrete, and asphalt construction materials.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.

Michael A. St. Pierre, P.E.
Senior Geotechnical Engineer

MAS:prw

APPENDIX A
Limitations

This report has been prepared for the exclusive use of Wentworth Partners & Associates for specific application to the Proposed Luce Bridge #0386 Replacement on Reed Road over Quick Stream in Salem Township, Maine. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.

APPENDIX B

Figures

N

LEGEND

APPROXIMATE BORING LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN PREPARED FROM ORTHOIMAGERY ENTITLED " MAINE ORTHOIMAGERY REGIONAL 2016," PROVIDED BY THE MAINE GEOLIBRARY (MEGIS).

2. THE BORINGS WERE LOCATED IN THE FIELD BY MEASUREMENTS FROM EXISTING SITE FEATURES.

3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.

4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

0 15 30 60 90 Feet

S.W.COLE ENGINEERING, INC.

WENTWORTH PARTNERS & ASSOCIATES

EXPLORATION LOCATION PLAN

LUCE BRIDGE REPLACEMENT
REED ROAD OVER QUICK STREAM
SALEM TOWNSHIP, MAINE

Job No.	23-0434	Scale	1" = 30'
Date:	06/09/2023	Sheet	1

APPENDIX C

Exploration Logs and Key

S.W.COLE ENGINEERING, INC.

www.swcole.com

KEY TO NOTES & SYMBOLS
Test Boring and Test Pit Explorations

Stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - laboratory test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. – pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight

Description of Proportions:

Trace:	0 to 5%
Some:	5 to 12%
"Y"	12 to 35%
And	35+%
With	Undifferentiated

Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to 1/2" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

BORING LOG

BORING NO.:	**B-1**
SHEET:	1 of 2
PROJECT NO.	23-0434
DATE START:	5/18/2023
DATE FINISH:	5/18/2023

CLIENT: Wentworth Partners & Associates
PROJECT: Luce Bridge No. 0386 Replaceent
LOCATION: Reed Road over Quick Stream, Salem Township, Maine

Drilling Information

LOCATION: See Exploration Location Plan **ELEVATION (FT):** N/A **TOTAL DEPTH (FT):** 57.0 **LOGGED BY:** Paul Kohler
DRILLING CO.: S. W. Cole Explorations, LLC **DRILLER:** Jeff Lee **DRILLING METHOD:** Cased Boring
RIG TYPE: Track Mounted CME 850 **AUGER ID/OD:** N/A / N/A **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic **HAMMER WEIGHT (lbs):** 140 **CASING ID/OD:** 4 in / 4 1/2 in **CORE BARREL:**
HAMMER CORRECTION FACTOR: 1.44 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): ▼ 7.5 ft Water in borehole on 5/18/2023. Borehole caved at 30 ft.
GENERAL NOTES: Water level of stream ±9 ft from roadway surface during drilling.

KEY TO NOTES AND SYMBOLS: Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_2O Depth	Remarks
			1D		0-2	24/6	2-2-4-34			Loose, brown, silty SAND, some gravel, some organics (FILL)		
										2.0 Dense, brown, silty SAND and GRAVEL, occasional cobbles (FILL)		
	5		2D		5-7	24/15	2-16-38-34	ID 30481G w =6.7 %		5.5 Medium dense to dense, brown, SAND and GRAVEL, some silt, frequent cobbles and small boulders	▼	
	10		3D		10-10.8	10/7	19-50/4"	ID 30482G w =11.5 %		12.0 Dense, rust-brown, silty SAND and GRAVEL, frequent cobbles and small boulders		
	15		4D		15-15.8	10/6	35-50/4"					
	20		5D		20-22	24/10	5-4-4-5			20.0 Loose to medium dense, gray, fine to medium SAND and SILT		Roller-cone through small boulder 19ft to 20ft
	25		6D		25-27	24/20	3-2-3-4	ID 30483G w =25.3 %				
	30		7D		30-32	24/18	2-3-2-4					Casing to 30 ft. Wash ahead/open boehole to 55ft.
	35		8D		35-37	24/18	4-4-5-6					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

(Continued Next Page)

BORING LOG

CLIENT: Wentworth Partners & Associates
PROJECT: Luce Bridge No. 0386 Replaceent
LOCATION: Reed Road over Quick Stream, Salem Township, Maine

BORING NO.: B-1
SHEET: 2 of 2
PROJECT NO. 23-0434
DATE START: 5/18/2023
DATE FINISH: 5/18/2023

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_20 Depth	Remarks
			9D		40-42	24/24	3-4-5-6			40.0 Loose to medium dense, brown, silty fine to medium SAND		
	45		10D		45-47	24/24	2-3-4-5			Loose to medium dense, gray and brown, silty fine SAND, trace fine gravel		
	50		11D		50-52	24/18	6-6-5-7			50.0 Medium dense, gray and brown, silty fine SAND		
	55		12D		55-57	24/24	6-9-9-11	ID 30484G w =24 %				

Bottom of Exploration at 57.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOG

BORING NO.:	**B-2**
SHEET:	1 of 2
PROJECT NO.	23-0434
DATE START:	5/19/2023
DATE FINISH:	5/19/2023

CLIENT: Wentworth Partners & Associates
PROJECT: Luce Bridge No. 0386 Replaceent
LOCATION: Reed Road over Quick Stream, Salem Township, Maine

Drilling Information

LOCATION: See Exploration Location Plan | **ELEVATION (FT):** N/A | **TOTAL DEPTH (FT):** 80.0 | **LOGGED BY:** Paul Kohler
DRILLING CO.: S. W. Cole Explorations, LLC | **DRILLER:** Jeff Lee | **DRILLING METHOD:** Cased Boring
RIG TYPE: Track Mounted CME 850 | **AUGER ID/OD:** N/A / N/A | **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic | **HAMMER WEIGHT (lbs):** 140 | **CASING ID/OD:** 4 in / 4 1/2 in | **CORE BARREL:**
HAMMER CORRECTION FACTOR: 1.44 | **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): ▼ 7 ft Water in borehole on 5/19/2023.
GENERAL NOTES: Water level of stream ±9 ft from roadway surface during drilling.

KEY TO NOTES AND SYMBOLS: Water Level: ▽ At time of Drilling; ▼ At Completion of Drilling; ▼ After Drilling
D = Split Spoon Sample; U = Thin Walled Tube Sample; R = Rock Core Sample; V = Field Vane Shear
Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.; q_u = Unconfined Compressive Strength, kips/sq.ft.; Ø = Friction Angle (Estimated); N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_2O Depth	Remarks
			1D		0-2	24/4	4-6-5-5			Loose, brown, gravelly silty SAND, occasional cobbles and mixed with organics (FILL)		
	5		2D		5-7	24/4	WOH/18"-4				▼	
										8.0 Medium dense, rust-brown, silty gravelly SAND, frequent cobbles and small boulders		
	10		3D		10-12	24/6	5-4-5-9	ID 30486G w =12.6 %				
	15		4D		15-17	24/12	14-14-13-18					
	20		5D		20-22	24/8	13-14-13-28	ID 30485G w =10.3 %				
										Medium dense, gray, SAND and GRAVEL, some silt, frequent cobbles and small boulders		
	25		6D		25-27	24/0	15-16-18-16					
	30		7D		30-32	24/6	10-6-15-8					
										31.5 Loose to medium dense, gray, silty fine to medium SAND		
	35		8D		35-37	24/12	6-5-5-6					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

(Continued Next Page)

BORING LOG

CLIENT: Wentworth Partners & Associates
PROJECT: Luce Bridge No. 0386 Replaceent
LOCATION: Reed Road over Quick Stream, Salem Township, Maine

BORING NO.: B-2
SHEET: 2 of 2
PROJECT NO. 23-0434
DATE START: 5/19/2023
DATE FINISH: 5/19/2023

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log	Sample Description & Classification	H_20 Depth	Remarks
			9D		40-42	24/12	5-4-4-5			Loose to medium dense, gray, silty fine to medium SAND		
	45		10D		45-47	24/16	4-4-4-3					
	50		11D		50-52	24/18	3-3-5-4					
	55		12D		55-57	24/17	4-3-4-4					Casing to 55 ft. Roller-cone to 80ft.
										57.0 Roller-cone probe from 57 ft to 80 ft (no sampling)		
	60									Probable gray silty SAND		
	65											
	70											
	75											
	80									Roller-cone through small boulder at 79 ft. Drill behavior incidcates possible denser granular soil		
										Bottom of Exploration at 80.0 feet		

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

APPENDIX D

Laboratory Test Results

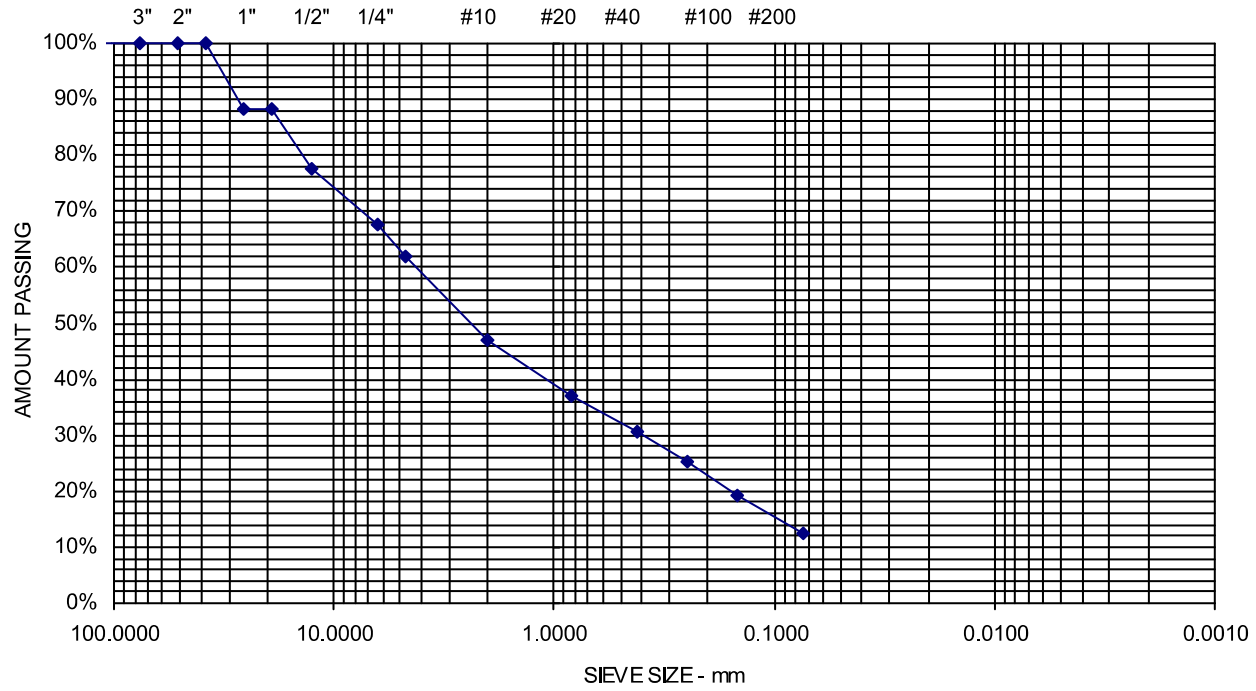
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	SALEM TOWNSHIP ME - PROPOSED LUCE BRIDGE REPLACEMENT - EXPLORATIONS AND GEOTECHNICAL	Project Number	23-0434
Client	WENTWORTH PARTNERS AND ASSOCIATES, INC.	Lab ID	30481G
		Date Received	5/23/2023
		Date Completed	5/31/2023
Material Source	**B-1, 2D, 5-7**	Tested By	SARAH SYLVIA

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**88**	
19.0 mm	**3/4"**	**88**	
12.5 mm	**1/2"**	**77**	
6.3 mm	**1/4"**	**68**	
4.75 mm	**No. 4**	**62**	38.2% Gravel
2.00 mm	**No. 10**	**47**	
850 um	**No. 20**	**37**	
425 um	**No. 40**	**31**	49.4% Sand
250 um	**No. 60**	**25**	
150 um	**No. 100**	**19**	
75 um	**No. 200**	**12.5**	12.5% Fines



Comments: w = 6.7%

S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

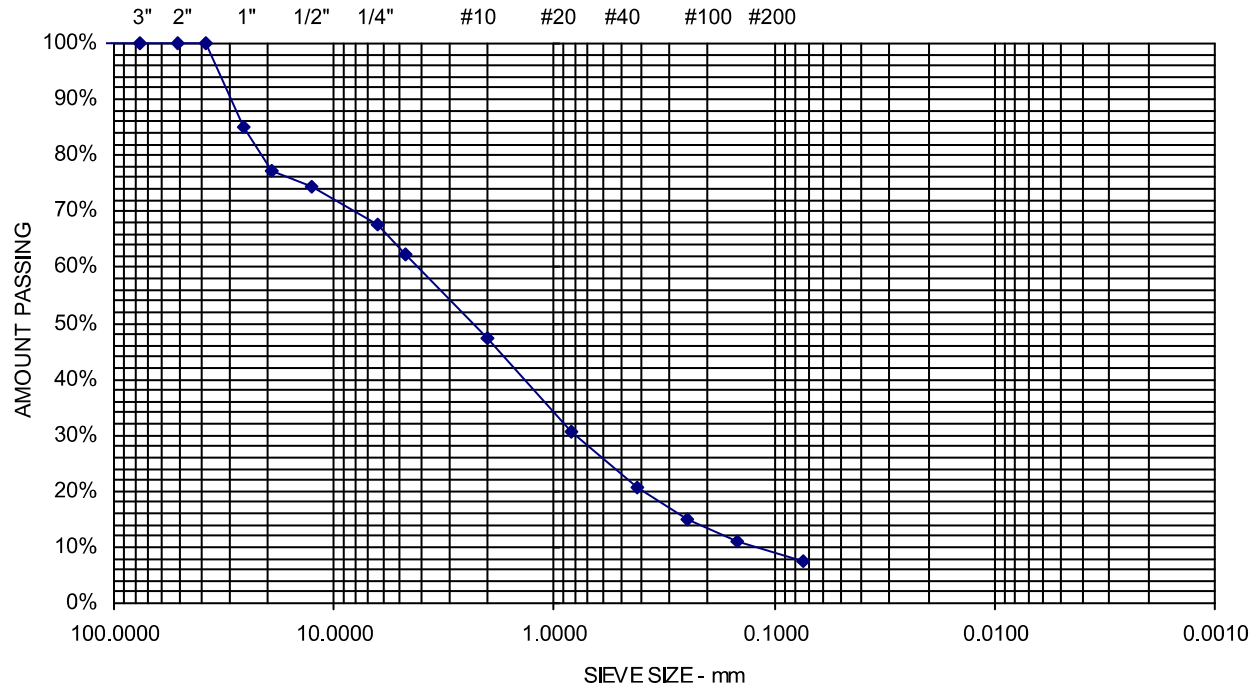
Project Name: SALEM TOWNSHIP ME - PROPOSED LUCE BRIDGE REPLACEMENT - EXPLORATIONS AND GEOTECHNICAL

Client: WENTWORTH PARTNERS AND ASSOCIATES, INC.

Material Source: **B-1, 3D, 10-12**

Project Number: 23-0434
Lab ID: 30482G
Date Received: 5/23/2023
Date Completed: 5/31/2023
Tested By: SARAH SYLVIA

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**85**	
19.0 mm	**3/4"**	**77**	
12.5 mm	**1/2"**	**74**	
6.3 mm	**1/4"**	**68**	
4.75 mm	**No. 4**	**62**	37.9% Gravel
2.00 mm	**No. 10**	**47**	
850 um	**No. 20**	**30**	
425 um	**No. 40**	**21**	54.8% Sand
250 um	**No. 60**	**15**	
150 um	**No. 100**	**11**	
75 um	**No. 200**	**7.3**	7.3% Fines



Comments: w = 11.5%

S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

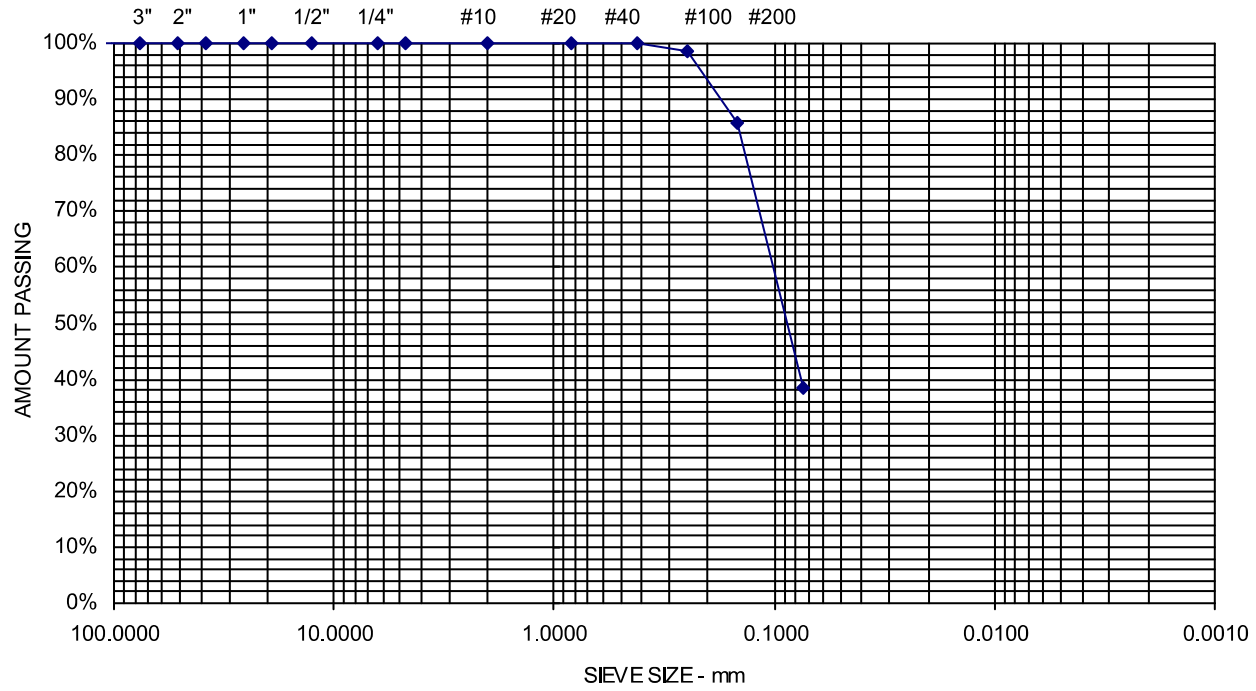
Project Name: SALEM TOWNSHIP ME - PROPOSED LUCE BRIDGE REPLACEMENT - EXPLORATIONS AND GEOTECHNICAL

Client: WENTWORTH PARTNERS AND ASSOCIATES, INC.

Material Source: **B-1, 6D, 25-27**

Project Number: 23-0434
Lab ID: 30483G
Date Received: 5/23/2023
Date Completed: 5/31/2023
Tested By: SARAH SYLVIA

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**100**	0% Gravel
2.00 mm	**No. 10**	**100**	
850 um	**No. 20**	**100**	
425 um	**No. 40**	**100**	61.7% Sand
250 um	**No. 60**	**99**	
150 um	**No. 100**	**86**	
75 um	**No. 200**	**38.3**	38.3% Fines



Comments: w = 25.3%

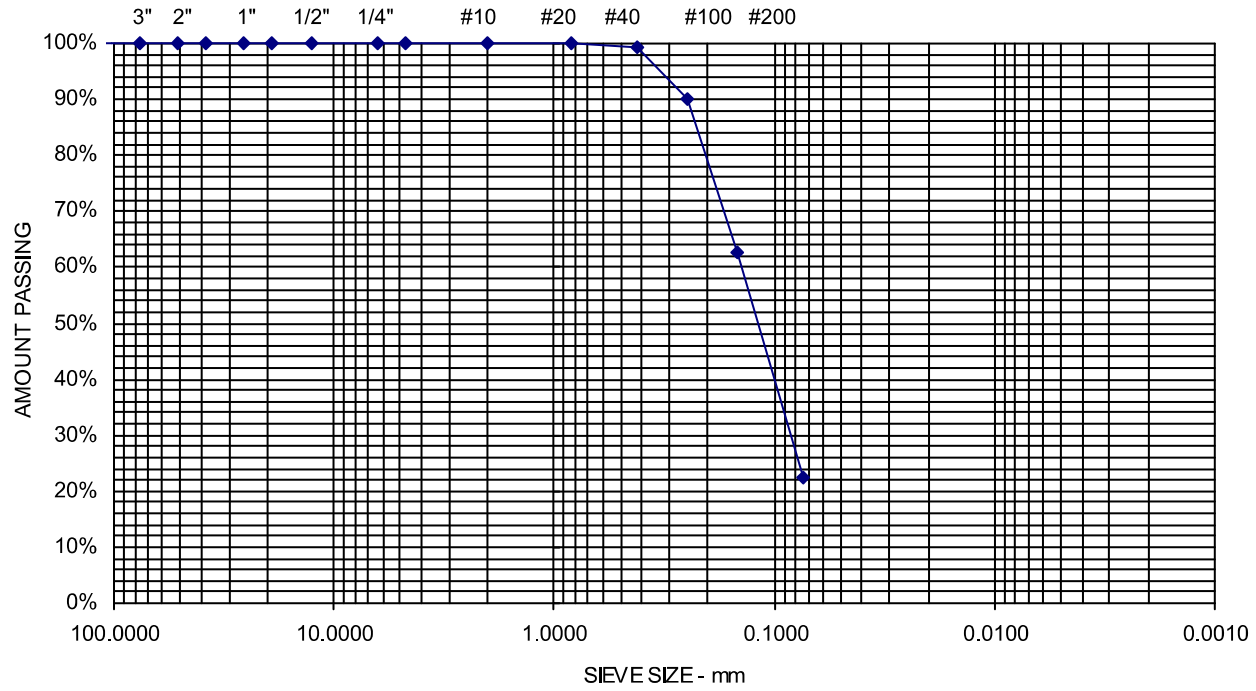
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	SALEM TOWNSHIP ME - PROPOSED LUCE BRIDGE REPLACEMENT - EXPLORATIONS AND GEOTECHNICAL	Project Number	23-0434
Client	WENTWORTH PARTNERS AND ASSOCIATES, INC.	Lab ID	30484G
		Date Received	5/23/2023
		Date Completed	5/31/2023
Material Source	**B-1, 12D, 55-57**	Tested By	SARAH SYLVIA

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**100**	0% Gravel
2.00 mm	**No. 10**	**100**	
850 um	**No. 20**	**100**	
425 um	**No. 40**	**99**	77.5% Sand
250 um	**No. 60**	**90**	
150 um	**No. 100**	**63**	
75 um	**No. 200**	**22.5**	22.5% Fines



Comments: w = 24%

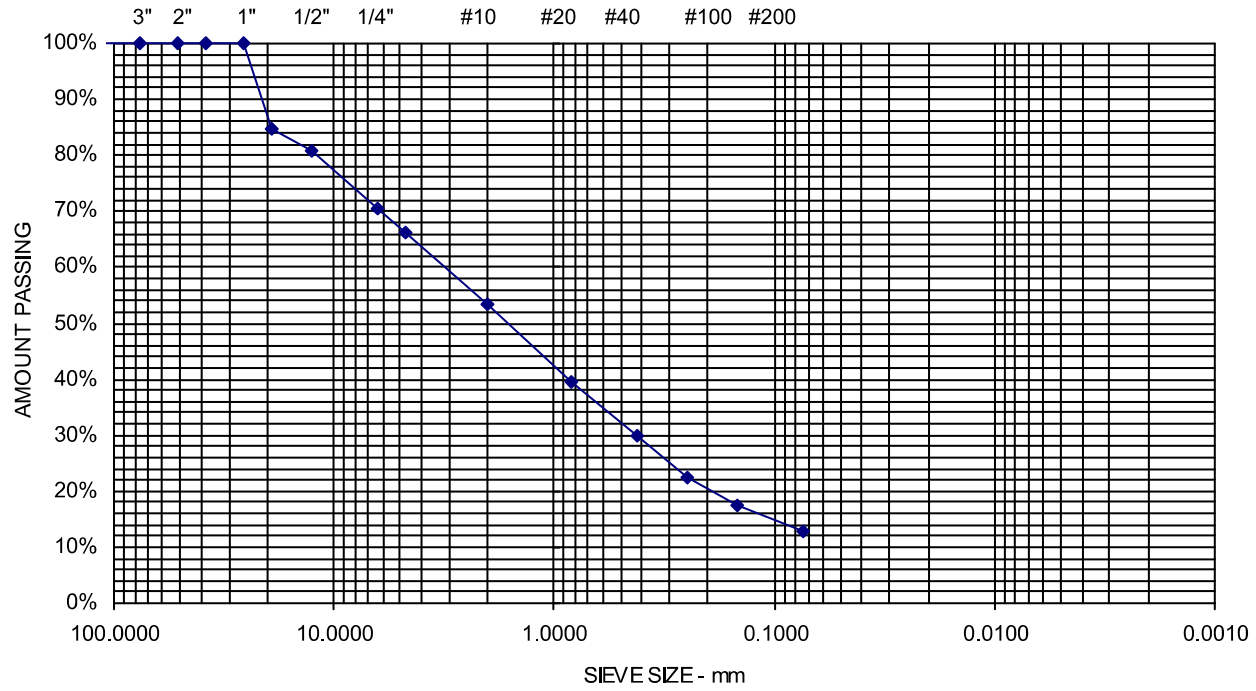
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	SALEM TOWNSHIP ME - PROPOSED LUCE BRIDGE REPLACEMENT - EXPLORATIONS AND GEOTECHNICAL	Project Number	23-0434
Client	WENTWORTH PARTNERS AND ASSOCIATES, INC.	Lab ID	30486G
		Date Received	5/23/2023
		Date Completed	5/31/2023
Material Source	**B-2, 3D, 10-12**	Tested By	SARAH SYLVIA

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**85**	
12.5 mm	**1/2"**	**81**	
6.3 mm	**1/4"**	**71**	
4.75 mm	**No. 4**	**66**	33.9% Gravel
2.00 mm	**No. 10**	**54**	
850 um	**No. 20**	**40**	
425 um	**No. 40**	**30**	53.2% Sand
250 um	**No. 60**	**22**	
150 um	**No. 100**	**18**	
75 um	**No. 200**	**12.9**	12.9% Fines



Comments: w = 12.6%

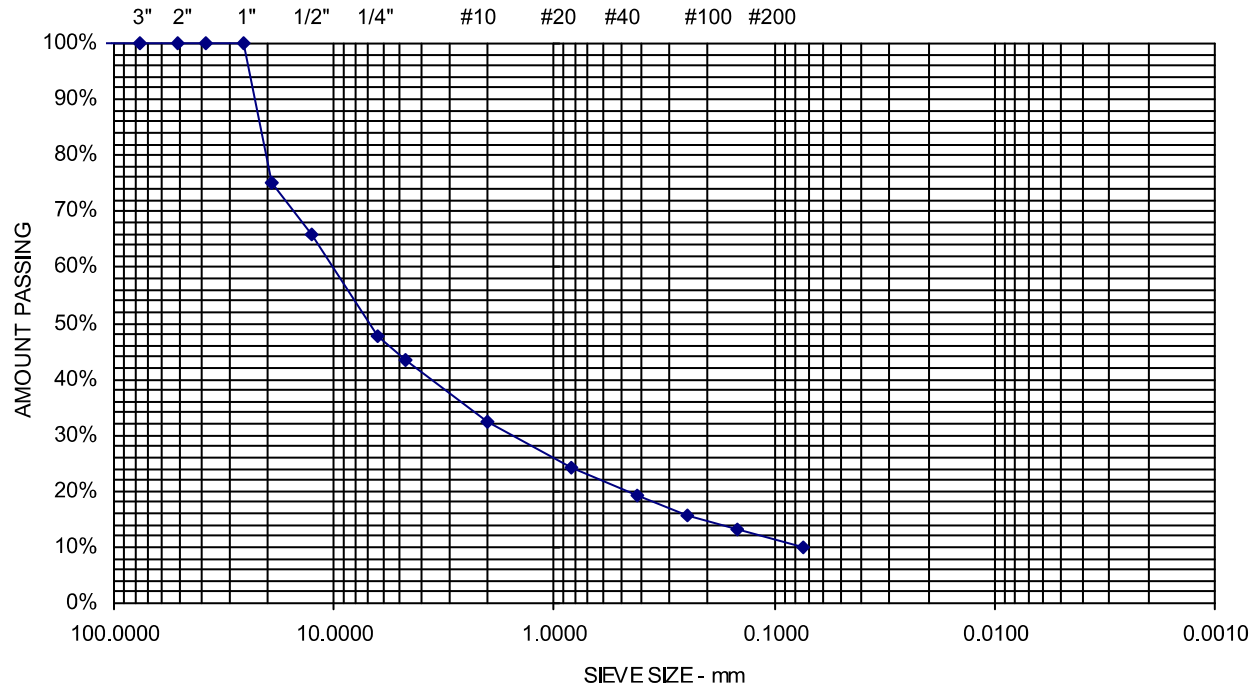
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	SALEM TOWNSHIP ME - PROPOSED LUCE BRIDGE REPLACEMENT - EXPLORATIONS AND GEOTECHNICAL	Project Number	23-0434
Client	WENTWORTH PARTNERS AND ASSOCIATES, INC.	Lab ID	30485G
		Date Received	5/23/2023
		Date Completed	5/31/2023
Material Source	**B-2, 5D, 20-22**	Tested By	SARAH SYLVIA

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**75**	
12.5 mm	**1/2"**	**66**	
6.3 mm	**1/4"**	**48**	
4.75 mm	**No. 4**	**43**	56.6% Gravel
2.00 mm	**No. 10**	**32**	
850 um	**No. 20**	**24**	
425 um	**No. 40**	**19**	33.4% Sand
250 um	**No. 60**	**16**	
150 um	**No. 100**	**13**	
75 um	**No. 200**	**9.9**	9.9% Fines



Comments: w = 10.3%

APPENDIX E

Calculations

S.W.COLE ENGINEERING, INC.

23-0434
Luce Bridge #0386 Replacement
Reed Road over Quick Stream
Salem Township, Maine

Determine Seismic Site Classification per AASHTO LRFD Table C3.10.3.1-1 - Method B

Data From B-1

Layer No.	Layer Description	Depth Range (ft)		N_{60} values recorded within layer										Average N_{60} value	Layer Thickness	d_i/N_i
		Top	End											Ni	di	
1	Fill	0	5.5	6	58									32.0	5.5	0.17
2	Glacial Deposit	5.5	20	100	100									100.0	14.5	0.15
3	Glacial Deposit	20	100	11	7	7	13	13	10	16	26			12.9	80	6.21
														Σ =	**100**	**6.53**

N_bar = di/di/Ni = **15.31**
Site Class **D**

Data From B-2

Layer No.	Layer Description	Depth Range (ft)		N_{60} values recorded within layer										Average N_{60} value	Layer Thickness	d_i/N_i
		Top	End											Ni	di	
1	Fill	0	8	12										12.0	8	0.67
2	Alluvium	8	31.5	10	33	37	47	29						31.2	23.5	0.75
3	Marine Deposit	31.5	80	14	10	10	10	8						10.4	48.5	4.66
4	Granular Soil	80	100	35										35.0	20	0.57
														Σ =	**100**	**6.65**

NOTES:
1. Weight of Rod (WOR) and Weight of Hammer (WOH) values taken as N=1
2. N60 values > 100 taken as N=100
3. N60 value for bedrock taken as N=100

N_bar = di/di/Ni = **15.03**
Site Class **D**

Calculated by/Date: MAS - Dec 2022
Checked by: TJB

Luce Bridge - Salem TWP

Conterminous 48 States
2007 AASHTO Bridge Design Guidelines
AASHTO Spectrum for 7% PE in 75 years
Latitude = 44.892199
Longitude = -070.274054
Site Class B
Data are based on a 0.05 deg grid spacing.

Period (sec)	Sa (g)	
0.0	0.076	PGA - Site Class B
0.2	0.163	Ss - Site Class B
1.0	0.049	S1 - Site Class B

Conterminous 48 States
2007 AASHTO Bridge Design Guidelines
Spectral Response Accelerations SDs and SD1
Latitude = 44.892199
Longitude = -070.274054
As = FpgaPGA, SDs = FaSs, and SD1 = FvS1
Site Class D - Fpga = 1.60, Fa = 1.60, Fv = 2.40
Data are based on a 0.05 deg grid spacing.

Period (sec)	Sa (g)	
0.0	0.121	As - Site Class D
0.2	0.261	SDs - Site Class D
1.0	0.118	SD1 - Site Class D

Luce Bridge - Salem TWP

Conterminous 48 States
2007 AASHTO Bridge Design Guidelines
Map Response Spectra for Site Class B
Latitude = 44.892199
Longitude = -070.274054
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B
Data are based on a 0.05 deg grid spacing.

Period (sec)	Sa (g)	Sd in.	
0.000	0.076	0.000	T = 0.0, Sa = PGA
0.060	0.163	0.006	T = To, Sa = Ss
0.200	0.163	0.064	T = 0.2, Sa = Ss
0.301	0.163	0.144	T = Ts, Sa = Ss
0.400	0.123	0.192	
0.600	0.082	0.288	
0.800	0.061	0.383	
1.000	0.049	0.479	T = 1.0, Sa = S1
1.200	0.041	0.575	
1.400	0.035	0.671	
1.600	0.031	0.767	
1.800	0.027	0.863	
2.000	0.025	0.959	
2.200	0.022	1.055	

2.400	0.020	1.150
2.600	0.019	1.246
2.800	0.018	1.342
3.000	0.016	1.438
3.200	0.015	1.534
3.400	0.014	1.630
3.600	0.014	1.726
3.800	0.013	1.821
4.000	0.012	1.917

Bearing Resistance of Spread Footing

Foundation Soil Parameters: medium dense to dense, SAND and GRAVEL, little silt (SW)

$\gamma_{sat} := 130\ pcf$ Saturated Unit Weight

$\gamma_{moist} := 125\ pcf$ Moist Unit Weight

$\phi := 32\ deg$ Undrained Friction Angle

$c_s := 0\ psf$ Undrained Shear Strength

$\gamma_w := 62.4\ pcf$ Unit Weight of Water

Foundation Patameters:

$B := \begin{bmatrix} 8 \\ 10 \\ 12 \\ 14 \\ 16 \end{bmatrix} ft$ Foundation Width

$D_f := 6.5\ ft$ Embedment Depth - embedded below frost

$D_w := 0\ ft$ Depth of Water Below Foundation

Bearing Resistance - Service Limit State

From AASHTO LRFD Table 10.6.2.5.1-1, Presumptive Bearing Resistance for Spread Footing Foundations at the Service Limit State Modified after U.S. Department of the Navy (1982)

Bearing Material: coarse to medium sand, and with little gravel (SW, SP)

Consistency in Place: medium dense to dense

Bearing Resistance Range: 4 to 8 ksf

Recommended Bearing Resistance: 4 ksf

Recommend Factored Bearing Resistance of 6 ksf to limit settlement for Service Limit State

Bearing Resistance - Strength Limit State

From AASHTO LRFD Section 10.6.3.1.2a

$$q_n = c_s \cdot N_{cm} + \left(\gamma_{sat} - \gamma_w\right) \cdot D_f \cdot N_{qm} \cdot C_{wq} + 0.5 \cdot \left(\gamma_{sat} - \gamma_w\right) \cdot B \cdot N_{\gamma m} \cdot C_{w\gamma}$$

From Table 10.6.3.1.2a-1

$N_c := 35.5$ $N_q := 23.2$ $N_\gamma := 30.2$

From Table 10.6.3.1.2a-2, for Dw = 0

$C_{wq} := 0.5$ $C_{w\gamma} := 0.5$

Nominal Bearing Resistance

LRFD Eqn 10.6.3.1.2a-1

$$q_n := c_s \cdot N_c + \left(\gamma_{sat} - \gamma_w\right) \cdot D_f \cdot N_q \cdot C_{wq} + 0.5 \cdot \left(\gamma_{sat} - \gamma_w\right) \cdot B \cdot N_\gamma \cdot C_{w\gamma}$$

$$q_n = \begin{bmatrix} 9.2 \\ 10.2 \\ 11.2 \\ 12.2 \\ 13.3 \end{bmatrix} \textit{ksf} \quad \text{for} \quad B = \begin{bmatrix} 8 \\ 10 \\ 12 \\ 14 \\ 16 \end{bmatrix} \textit{ft}$$

Factored Bearing Resistance

From AASHTO LRFD Table 10.5.5.2.2-1, Resistance Factor for Geotechnical Resistance of Shallow Foundations at the Strength Limit State

$\varphi_b := 0.45$

$q_r := \varphi_b \cdot q_n$

$$q_r = \begin{bmatrix} 4.1 \\ 4.6 \\ 5 \\ 5.5 \\ 6 \end{bmatrix} \textit{ksf} \quad \text{for} \quad B = \begin{bmatrix} 8 \\ 10 \\ 12 \\ 14 \\ 16 \end{bmatrix} \textit{ft}$$ **Strength Limit Factored Bearing Resistance**

APPENDIX D
PROJECT PERMITS

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

May 1, 2024

Regulatory Division
File Number: NAE-2024-00722

Amy Bernard
Franklin County
140 Main Street APT 3
Farmington, Maine 04938
Sent by email: abernard@franklincountymaine.gov

Dear Ms. Bernard:

The U.S. Army Corps of Engineers (USACE) has reviewed your application to place permanent and temporary fill below the ordinary high mark of Quick Stream and in adjacent freshwater wetlands off Reed Road (44.89216ºN, -70.27403°W) in Salem Township, ME in order to replace an existing stream crossing. The project will result approximately 3269sf of permanent and 3,114sf. temporary impact to the streambed and 2,447sf of permanent and 3,175sf. temporary impact to wetlands. The work is shown on the enclosed plans titled "Project Drawings for Reed Road at Quick Stream for Salem Township" on twenty-nine (29) sheets dated on 03/28/2024.

Based on the information that you have provided, we verify that the activity is authorized under General Permits: # 22. Stream and Wetland Work and Crossings; 10. Linear Transportation Projects and 21.Habitat Restoration, Establishment and Enhancement Activities of October 14, 2020, federal permits known as the Maine General Permits (GPs). The GPs are available at https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Maine-General-Permit.

Please review the enclosed GPs carefully, in particular the general conditions beginning on page 5, and ensure that you and all personnel performing work authorized by the GPs are fully aware of and comply with its terms and conditions.

You must complete and return the enclosed Work Start Notification Form to this office at least two weeks before the anticipated starting date. You must complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

This authorization expires on October 14, 2025. You must commence or have under contract to commence the work authorized herein by October 14, 2025 and complete the work by October 14, 2026. If not, you must contact this office to determine the need for further authorization and we recommend you contact us *before* the work authorized

herein expires. Please contact us immediately if you change the plans or construction methods for work within our jurisdiction as we must approve any changes before you undertake them. Performing work within our jurisdiction that is not specifically authorized by this determination or failing to comply with the special condition(s) provided above or all of the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations.

This authorization does not obviate the need to obtain other federal, state, or local authorizations required by law. Applicants are responsible for applying for and obtaining any other approvals.

We continually strive to improve our customer service. To better serve you, we would appreciate your completing our Customer Service Survey located at https://regulatory.ops.usace.army.mil/customer-service-survey/

Please contact Heather Stukas, of my staff at (207) 623-8367 ext. 8 or heather.s.stukas@usace.army.mil if you have any questions.

Sincerely,

Digitally signed by
Heather S. Stukas
Date: 2024.05.03
10:04:14 -04'00'

For: Peter D. Olmstead
Chief, Maine Section
Regulatory Division

Enclosures
Plans titled “Project Drawings for Reed Road at Quick Stream for Salem Township” on twenty-nine (29) sheets dated on 03/28/2024.

cc.
Steve Govoni, agent (sgovoni@wpa-design.com)

US Army Corps of Engineers®
New England District

WORK-START NOTIFICATION FORM

****

EMAIL TO: heather.s.stukas@usace.army.mil or cenae-r@usace.army.mil; or

MAIL TO: Heather Stukas
Regulatory Division
U.S. Army Corps of Engineers, New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

****

Corps of Engineers Permit No. **NAE-2024-00772** was issued to **Franklin County c/o Amy Bernard**. This work authorized the placement of permanent and temporary fill below the ordinary high mark of Quick Stream and in adjacent freshwater wetlands off Reed Road (44.89216ºN, -70.27403°W) in Salem Township, ME in order to replace an existing stream crossing. The project will result approximately 3269sf of permanent and 3,114sf. temporary impact to the streambed and 2,447sf of permanent and 3,175sf. temporary impact to wetlands.

The people (e.g., contractor) listed below will do the work, and they understand the permit's conditions and limitations.

PLEASE PRINT OR TYPE

Name of Person/Firm: _____

Business Address: _____

_____

_____

Phone & email: (___) _____ (___) _____ _____

Proposed Work Dates: **Start:** _____ **Finish:** _____

Permittee/Agent Signature: _____ **Date:** _____

Printed Name: _____ **Title:** _____

Date Permit Issued: _____ **Date Permit Expires:** _____

****

FOR USE BY THE CORPS OF ENGINEERS

PM: Stukas **Submittals Required:** _____

Inspection Recommendation: random compliance inspections

US Army Corps of Engineers®
New England District

(Minimum Notice: Permittee must sign and return notification within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

Permit Number: NAE-2024-00772

Name of Permittee: Franklin County c/o Amy Bernard

Permit Issuance Date: _____

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

****
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch C *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *
****

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee | Date

_____ _____

Printed Name | Date of Work Completion

(_____) _____ (_____) _____

Telephone Number | Telephone Number

Wentworth Partners & Associates, Inc.
31 Commercial Street
P.O. Box 2285
Skowhegan, ME 04976