PROJECT MANUAL BIDDING REQUIREMENTS AND SPECIFICATIONS
LONG CREEK – MAIN STEM RESTORATION PROJECT
LONG CREEK WATERSHED MANAGEMENT DISTRICT
SOUTH PORTLAND, MAINE
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BIDDING & CONTRACT DOCUMENTS
SECTION 00020

INVITATION TO BID

1. BACKGROUND

The Long Creek Watershed Management District (“LCWMD”) is seeking proposals from qualified construction contractors to implement an in-stream habitat and floodplain restoration project for the Main Stem of Long Creek from Maine Mall Road downstream to Foden Road in South Portland, Maine. The primary objective of the restoration project is to enhance habitat conditions for fish, macroinvertebrates, and other aquatic organisms as well as restore natural stream and floodplain functions.

Long Creek is a freshwater urban stream system in southern Maine. The Long Creek Watershed is approximately 3.45 square miles and is located in Portland, South Portland, Westbrook, and Scarborough, Maine. Long Creek currently does not meet Maine water quality standards due to the influences of increased concentrations of metals, chloride, phosphorus, nitrogen, polycyclic aromatic hydrocarbons, and reduced dissolved oxygen concentrations. Water quality is also adversely affected by altered hydrological conditions and increased water temperatures from lack of shading in certain areas.

LCWMD is a quasi-municipal, special purpose district established as a separate legal entity and instrumentality and as a body corporate and politic under the laws of the State of Maine. LCWMD was formed to provide the structure for the cooperative implementation of the Long Creek Watershed Management Plan (“Watershed Management Plan”). Implementation of the Watershed Management Plan is required of permittees under the General Permit – Post Construction Discharge of Stormwater in the Long Creek Watershed issued by the Maine Department of Environmental Protection (“Maine DEP”) on April 15, 2015. The Watershed Management Plan includes but is not limited to design, engineering, construction, reconstruction, installation, operation, modification, alteration, use, maintenance, repair, replacement, inspection and monitoring of public and private stormwater management structures, facilities and improvements, including structural and non-structural Best Management Practices, in and along Long Creek and within the Long Creek Watershed. The Watershed Management Plan lays out a course of action toward improving water quality in Long Creek and meeting water quality goals by 2020. The Cumberland County Soil & Water Conservation District (“CCSWCD”) provides technical support to LCWMD for implementation of the Watershed Management Plan.

The Watershed Management Plan, as well as other supporting documentation, is available on LCWMD’s website at: www.restorelongcreek.org.
2. **PROJECT NAME**

Long Creek – Main Stem Restoration Project, Long Creek Watershed Management District, South Portland, Maine.

3. **LOCATION**

Floodplain of the Main Stem of Long Creek within the bounds of Maine Mall Road, Gorham Road, Darling Avenue, and Foden Road, South Portland, Maine.

4. **PROJECT DESCRIPTION**

The project consists of:

1. Removal of fill in the restoration area that is intruding on the original floodplain;
2. Construction of gravel core mounds in the restored floodplain to allow the input of gravel substrate to the creek as the channel migrates across the floodplain;
3. Repair and stabilization of two areas of bank erosion that input fine sediment to the creek;
4. Installation of root wads and simulated log jams within the restoration area to mimic natural accumulations of wood and encourage colonization of the restored stream with macroinvertebrates; and,
5. Stabilization of embankments at locations of fill removal to a slope that is suitable for native soils and that will support revegetation.

5. **PLANS AND SPECIFICATIONS**

The specific work required is shown on the Plans entitled “Long Creek – Main Stem Restoration Project – Long Creek Watershed Management District – South Portland, Maine” dated June 2019, prepared by St. Germain Collins, Inc. Plans and specifications are posted in electronic form on LCWMD’s website at [www.restorelongcreek.org](http://www.restorelongcreek.org) under “Documents” then “Current Request for Proposals/Qualifications.” Plans and specifications will be available in hard copy after **1:00 PM on June 26, 2019** at the offices of the Cumberland County Soil & Water Conservation District, 35 Main Street, Suite 3, Windham, Maine 04062, between the hours of 7:00 AM and 4:00 PM on weekdays (*note*: the office will be closed on July 4 and 5, 2019). Questions concerning plan sets or specification should be directed to Christopher Baldwin, P.E., who is the Engineer of record for this project and can be reached at cbaldwin@cumberlandswcd.org or (207) 892-4700.

6. **MANDATORY PRE-BID CONFERENCE**

A mandatory pre-Bid conference will be held at **9:00 AM on July 9, 2019** at the back of the property located at 311 Darling Avenue in South Portland, Maine adjacent to the Long Creek stream corridor. Attendance at the pre-Bid conference is mandatory.

7. **QUESTIONS**

Comments and/or questions concerning this Request for Proposals (“RFP”) must be received by LCWMD’s Executive Director, Peter Carney, via email to pcarney@restorelongcreek.org, by phone to (207) 894-4320, or delivery to LCWMD Main Stem Restoration Project RFP – Questions, c/o CCSWCD, 35 Main Street, Suite 3, Windham, ME 04062, no later than **4:00 PM on July 12, 2019**.
8. **ADDENDA TO THE REQUEST FOR PROPOSALS**

Addenda, if any, to the RFP will be issued on or before **4:00 PM on July 16, 2019**. Addenda will be provided to attendees of the mandatory pre-Bid conference and will be posted to LCWMD’s website. Failure of a proposal to address information in any issued addenda may result in rejection of the proposal.

9. **RECEIPT OF BIDS**

Bids must be received by LCWMD c/o CCSWCD at 35 Main Street, Suite 3, Windham, ME 04062 on or before **3:00 PM on July 25, 2019**. Submissions must be sealed and clearly marked: “Main Stem Restoration Project RFP – Proposal.” Bids will be publicly opened at 3:00 PM on July 25, 2019 at the offices of CCSWCD, 35 Main Street, Suite 3, Windham, Maine. Emailed proposals will not be accepted.

10. **BID BOND**

A satisfactory Bid Bond executed by the Bidder and a Surety Company in the amount equal to five percent (5%) of the Bid shall be submitted with each Bid. No Bid may be withdrawn for at least 60 days after receipt of Bids unless released by the Owner.

11. **BIDDER QUALIFICATIONS**

Refer to Instructions to Bidders for information regarding qualifications of Bidders.

12. **CONTRACT TIME**

In-stream construction Work is to be completed on or before **September 30, 2019**, which is the typical end of the construction window under the U.S. Army Corps of Engineers (“Army Corps”) general permit being sought for the Project, unless extended by the Army Corps. Work, other than in-stream construction Work, is to be substantially completed on or before **October 15, 2019** and is to be completed and ready for final payment on or before **October 31, 2019**.

13. **ACCEPTANCE OF BID**

The Owner reserves the right to reject any and all Bids, to waive any and all informalities, and to negotiate contract terms with the successful Bidder, and the right to disregard all non-conforming, non-responsive, or conditional Bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
INSTRUCTIONS TO BIDDERS

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ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. Issuing Office – The office from which the Bidding Documents are to be issued.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder’s qualifications to perform the Work, Bidder shall submit with its Bid (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

A. Evidence of Bidder’s authority to do business in the state where the Project is located.

B. Bidder’s state or other contractor license number, if applicable.

C. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, “Subcontractors, Suppliers, and Others.”

D. Statement of Bidder’s Qualifications, Section 00405.

3.02 A Bidder’s failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder’s qualifications.

3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder’s representations and certifications.

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER’S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 Site and Other Areas

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.
B. With respect to the My Darling LLC property, deliveries that require parking spots to be blocked in addition to the open parking spots for the Temporary Construction Access Area will be done on weekends, or on weekdays before 7:30 a.m. or after 5:30 p.m.

4.02 Existing Site Conditions

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:
   a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
   b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
   c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
   d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.


The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and
Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 Site Visit and Testing by Bidders

A. Bidder shall conduct the required Site visit simultaneously with the mandatory pre-Bid conference as provided for in the Invitation to Bid, and shall not disturb any ongoing operations at the Site.

B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner’s authority regarding the Site.

D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 Owner’s Safety Program

A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 Other Work at the Site

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER’S REPRESENTATIONS

5.01 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;
B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;

E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding 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 Bidder; and (3) Bidder’s safety precautions and programs;

F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

**ARTICLE 6 – PRE-BID CONFERENCE**

6.01 A pre-Bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.
ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of Bidder’s maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner’s exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which the Work is to be substantially completed, and completed and ready for final payment, are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND “OR-EQUAL” ITEMS

11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or “or-equal”
item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.

11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 Bidders shall submit with their Bid to Owner a list of the Subcontractors or Suppliers proposed for any portions of the Work.

Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request that the apparent successful Bidder submit an acceptable substitute, in which case the Bidder shall submit a substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to another Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”

13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.

13.03 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership’s address for receiving notices shall be shown.

13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm’s address for receiving notices shall be shown.
13.05 A Bid by an individual shall show the Bidder’s name and address for receiving notices.

13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture’s address for receiving notices shall be shown.

13.07 All names shall be printed in ink below the signatures.

13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

13.10 The Bid shall contain evidence of Bidder’s authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder’s state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID

14.01 Base Bid with Alternates

A. Bidders shall submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

ARTICLE 15 – SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.

A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. Bids must be received by LCWMD c/o CCSWCD at 35 Main Street, Suite 3, Windham, ME 04062 on or before 3:00 PM on July 25, 2019. Submissions must be sealed and clearly marked: “Main Stem Restoration Project RFP - Proposal.” Bids will be publicly opened at 3:00 PM on July 25, 2019 at the offices of CCSWCD, 35 Main Street, Suite 3, Windham, Maine. Emailed proposals will not be accepted.

15.02 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the
date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be
returned to the Bidder.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in
the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the
opening of Bids.

16.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner
and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a
material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid,
and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be
disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and,
unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base
Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but
Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of
this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming,
nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that
Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports
to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents,
or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the
Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive
all minor informalities not involving price, time, or changes in the Work.

19.02 If Owner awards the contract for the Work, such award shall be awarded by Owner’s Board of
Directors based upon the proposer whose: proposal conforms to this RFP; will be the most
advantageous to Owner; and is in the best interests of the public.

19.03 Evaluation of Bids

A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed
requirements, and such alternates, unit prices, and other data, as may be requested in the
Bid Form or prior to the Notice of Award.

B. Proposals will be reviewed by Owner’s Executive Director and members of Owner’s Board
of Directors. Owner will evaluate all proposals that conform to the requirements of this
RFP. Owner will award a contract based upon a combination of qualifications, cost, and
value, as follows:

<table>
<thead>
<tr>
<th>Qualifications Selection Criteria</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Proposal: This criterion will evaluate the details of the proposer’s work plan for performing the Work, whether the supporting materials submitted with the proposal support the</td>
<td>10</td>
</tr>
</tbody>
</table>
proposer’s assertions relevant to qualifications, and whether sufficient details are provided to evaluate cost and value of the proposer’s services.

| **Experience and Reputation:** This criterion will evaluate the history of the proposer’s organization, general background, experience, reputation, and years in business. | 15 |
| **Expertise for This Type of Project:** This criterion will evaluate the proposer’s overall technical expertise for providing stream restoration services. Factors will include a general overview of proposer’s experience in stream restoration implementation including inset floodplain construction and channel and bank stabilization work. | 20 |
| **Capacity to Meet Requirements of the Contract:** This criterion will evaluate the proposer’s employees’ specific experience, whether the proposer has sufficient equipment to complete the project, the proposer’s ability to complete the project on time and within budget, and proposer’s financial stability. | 15 |
| **Total Overall Value:** This criterion will be an assessment of the proposal’s overall cost relative to the results of the other qualifications selection criteria for the proposal. | 20 |
| **Safety Record and Related Training:** This criterion will evaluate the proposer’s safety record and related training. | 10 |
| **References:** This criterion will evaluate the proposer’s references as related to the proposer’s ability to fulfill the project requirements, qualifications, ability to work with the project budget, and ability to complete the work in a timely and efficient manner. | 10 |
| **TOTAL** | **100** |

C. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

**ARTICLE 20 – BONDS AND INSURANCE**

20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner’s requirements as to performance and payment bonds and insurance. When the
Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

**ARTICLE 21 – SIGNING OF AGREEMENT**

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

**ARTICLE 22 – SALES AND USE TAXES**

22.01 Owner is exempt from Maine state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. E82328). Said taxes shall not be included in the Bid. Refer to Paragraph SC-7.09 of the Supplementary Conditions for additional information.
SECTION 00405

STATEMENT OF BIDDER’S QUALIFICATIONS

All bidding Contractors are required to be certified Erosion Control Contractors by the Maine Department of Environmental Protection prior to the start of construction. Information can be obtained at the following website: http://www.maine.gov/dep/training/npstre-schedule.html.

All questions must be answered with clear and comprehensive data; if necessary, add additional pages. This statement must be notarized.

1. Name of Bidder and Contact Person(s) including the Project Manager: __________________________
   ____________________________________________

2. Permanent Main Office address, telephone, fax, email: __________________________
   ____________________________________________

3. Organizational Structure: ____________________________________________
   ____________________________________________

4. Please provide the year the Contractor (and note any Predecessor Entities or Related Entities) were first organized. ____________________________________________
   ____________________________________________

5. Please list any Predecessor Entities below (or on attached sheets if necessary). _________________
   ____________________________________________

6. Please list any Related Entities below (or on attached sheets if necessary). _________________
   ____________________________________________

7. Where incorporated. ____________________________________________

8. How many years have you been engaged in the contracting business under your present firm name? Also state names and dates of previous firm names, if any. ____________________________________________

9. Most Recently Completed Contracts. Please provide the following information regarding the last six contracts completed by the Contractor. Please list in reverse chronological order (most recently completed project first, next most recently completed project, etc.). [Please feel free to provide this information on attached sheets in another format as long as it contains the information requested].

<table>
<thead>
<tr>
<th>Contract Amount</th>
<th>Project Type and Location</th>
<th>Month/Year Completed</th>
<th>Name, Address, Contact Person and Telephone Number of Owner</th>
</tr>
</thead>
</table>

ST. GERMAIN COLLINS

STATEMENT OF BIDDER’S QUALIFICATIONS

00405 - 1
10. Please state other work of a similar nature to that stated in the Bid Proposal, including references that will assist the Owner to judge experience, skill and business standing:

<table>
<thead>
<tr>
<th>Contract Amount</th>
<th>Project Type and Location</th>
<th>Month/Year Completed</th>
<th>Name, Address, Contact Person and Telephone Number of Owner</th>
</tr>
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</tbody>
</table>

11. **Contracts in Progress.** Please provide the following information regarding all contracts currently in progress, in descending order of contract amount. [Please feel free to provide this information on attached sheets in another format as long as it contains all the information requested.]

<table>
<thead>
<tr>
<th>Contract Amount</th>
<th>Project Type and Location</th>
<th>% Completed</th>
<th>Start Date and End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
12. **Liquidated Damages:**

(a) Within the last five years has the Contractor (or any Predecessor Entities or Related Entities) had liquidated damages assessed against it?

YES _____ NO _________

(b) Within the last five years has the Contractor (or any Predecessor Entities or Related Entities) had liquidated damages accrue which were not assessed by the Owner?

YES _____ NO _________

If YES, to (a) or (b) above please provide full details on attached sheets including the per diem amount of liquidated damages, the original contract time, and the number of days for which liquidated damages were accrued and/or assessed. Please feel free to include a written summary of your position on the matter.

14. **Terminations, Suspensions or Defaults:**

(a) Within the last five years has a contract of the Contractor (or any Predecessor Entities or Related Entities) been terminated or suspended for cause?

YES _____ NO _________

(b) Within the last five years has another party (e.g. surety) completed Work which the Contractor (or any Predecessor Entities or Related Entities) was originally responsible to perform?

YES _____ NO _________

(c) Within the last five years has the Contractor (or any Predecessor Entities or Related Entities) been considered in default of a contract that was not cured within the time frame allowed by the contract?

YES _____ NO _________
If the answer to any of questions 13(a)-(c) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

15. Denial of Prequalification or Award:

(a) Within the last five years has any federal, state, local government, or procurement agency denied the Contractor (or any Predecessor Entities or Related Entities) prequalification?

YES _______ NO________

(b) Within the last five years has any federal, state, or local government or procurement agency, after the Contractor (or any Predecessor Entities or Related Entities) submitted the apparent low bid, refused to award a contract for reasons related to the Contractor’s qualifications, experience, competence, or financial situation?

YES _______ NO________

If the answer to either of questions 14(a) or (b) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

16. Debarments, Etc.:

(a) Within the last five years, has the Contractor (or any Predecessor Entities or Related Entities) been debarred for any reason by any federal, state, or local government or procurement agencies?

YES _______ NO________

(b) Within the last five years has the Contractor (or any Predecessor Entities or Related Entities) refrained from bidding for any reason, such as suspension or agreement not to bid, or as part of the settlement of a Dispute of any type with any federal, state, or local government or procurement agencies?

YES _______ NO________

If the answer to either of questions 15(a) or (b) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

17. Claims History:

(a) Within the last five years has the Contractor (or any Predecessor Entities or Related Entities) been a party to a Claim with an originally claimed amount in excess of $50,000?

YES _______ NO________

If YES, please provide full details for each Claim on attached sheets including (a) whether the Claim was brought by or against the Contractor (or any Predecessor Entities or Related Entities), (b) the nature of the Dispute underlying the Claim, (c) originally claimed amounts, (d) the resolution of such Claims (including the amount) or if unresolved, the current status of such Claims, and (e) the name, address and phone number of the primary
adverse party who can be contacted for additional information, and (f) a written summary of your position on the matter (if desired).

18. List your major equipment available for this contract. Please identify the number of crews you anticipate will be working concurrently on this project.

19. Please list the following information for your key personnel such as Project Manager, Office Manager, Project Superintendent, Quality Control, Safety Oversight, and Foreperson assigned to this contract.

<table>
<thead>
<tr>
<th>Name</th>
<th>Relevant Licenses or Certifications</th>
<th>Experience (# Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Office Manager</td>
<td></td>
<td></td>
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<tr>
<td>3. Project Superintendent</td>
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<td></td>
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<tr>
<td>4. On Site Quality Control</td>
<td></td>
<td></td>
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<tr>
<td>5. Safety Oversight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Foreperson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Identify how many projects your Project Manager will manage concurrent with this project. Include dollar value and end date.

20. List any subcontractors whom you would expect to use and the general components of the Project for which they will be responsible. Indicate other projects on which the proposed subcontractor has worked with you.

21. Safety:

(a) Does the Contractor have a Written Safety Plan?

YES _______ NO__________
If YES,

What Year was it first adopted? __________________________
What Year was it last substantially revised? __________________________

(b) How many reportable work-related injuries have proposer’s employees suffered during the past five years?

(c) What safety-related training does proposer have?

(d) Please indicate the number of Underground Facilities Reports the Contractor has filed with the Maine Public Utilities Commission in each of the last five years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
</tr>
</tbody>
</table>

22. Financial and Bonding Capacity:

(a) The Bidder shall be capable of obtaining from a Qualifying Bonding Company (defined below) a performance bond and a payment bond each in the amount of the bid prices that the Contractor will be submitting to Owner.

Attach a letter from a Qualifying Bonding Company that (a) states that the said company meets the definition of “Qualifying Bonding Company” and (b) sets forth the bonding capacity of the Contractor including a specific dollar amount for single project and aggregate amount. Letters indicating “unlimited” bonding capacity are not acceptable. Meeting the bonding capacity requirements by combining bonding capacity of subcontractors is not acceptable.

A Qualifying Bonding Company is defined as an insurance, bonding, and/or surety company that is (a) licensed or approved by the State of Maine Department of Business Regulation, Bureau of Insurance, to do business in the State of Maine AND (b) listed on the most recent Federal Department of the Treasury listing of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies.

(b) Name and address of banking institutions with which you do business.

________________________________________________________________________

(c) Do you grant Owner permission to contact this (these) institutions for the purpose of determining if the contractor has sufficient cash on hand or available line of credit to complete the work?

YES ________ NO ________

23. Environmental Experience:
(a) Do you have expertise in providing stream restoration services? Please include a general overview of your experience in stream restoration implementation including inset floodplain construction and channel and bank stabilization work.

(b) Describe your prior experience working in streams and wetlands.

Dated at this day of , 20

(Name of Bidder)
By:______________________________

State of S
Title: ________________________________

County of ______________

being duly sworn, deposes and says that he is of (Name of Organization) and that the answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to before me this day of , 20

(Notary Public): ________________________________

My commission expires: ________________________________

END OF SECTION
BID FORM

Long Creek – Main Stem Restoration Project, Long Creek Watershed Management District,
South Portland, Maine

[Insert Contract Identification and Number]
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<th>Page</th>
</tr>
</thead>
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<td>1</td>
</tr>
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<td>Article 3 – Bidder’s Representations</td>
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<td>Article 8 – Defined Terms</td>
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</tr>
<tr>
<td>Article 9 – Bid Submittal</td>
<td>3</td>
</tr>
</tbody>
</table>
ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Long Creek Watershed Management District
35 Main Street, Suite 3
South Windham, Maine 04062

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Addendum, Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding 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 Bidder; and (3) Bidder’s safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder 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 Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER’S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. “corrupt practice” means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.
ARTICLE 5 – BASIS OF BID

Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lump Sum Bid Price for Base Bid</td>
<td>$</td>
</tr>
<tr>
<td>Alternate A [Add]: Sheet Pile Detention Basin Removal</td>
<td>$</td>
</tr>
<tr>
<td>Lump Sum Contingency Allowance</td>
<td>$</td>
</tr>
</tbody>
</table>

Total of All Lump Sums: $ __________________

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that in-stream construction Work will be complete on or before September 30, 2019 and Work, other than in-stream construction Work, will be substantially complete on or before October 15, 2019, and will be complete and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before October 31, 2019.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;
B. List of Proposed Subcontractors;
C. List of Proposed Suppliers;
D. List of Project References;
E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;
F. Contractor’s License No.: ________ [or] Evidence of Bidder’s ability to obtain a State Contractor’s License and a covenant by Bidder to obtain said license within the time for acceptance of Bids;
G. Required Bidder Qualification Statement with supporting data.

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

BIDDER: [Indicate correct name of bidding entity]
By:  
[Signature]  
[Printed name]  
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:  
[Signature]  
[Printed name]  

Title:  

Submittal Date:  

Address for giving notices:  

Telephone Number:  

Fax Number:  

Contact Name and e-mail address:  

Bidder’s License No.:  
(where applicable)
BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered 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—Include Location):

BOND
Bond Number: 
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 (Seal) SURETY (Seal)
Bidder’s Name and Corporate Seal Surety’s Name and Corporate Seal

By: By: 
Signature (Attach Power of Attorney) 

Print Name

Title

Attest: Attest: 
Signature 

Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, 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 the 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 the 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 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.
NOTICE OF AWARD

Date of Issuance:

Owner: 
Owner’s Contract No.: 

Engineer: 
Engineer’s Project No.: 

Project: 
Contract Name: 

Bidder: 
Bidder’s Address: 

TO BIDDER:

You are notified that Owner has accepted your Bid dated [________________] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

[describe Work, alternates, or sections of Work awarded] 

The Contract Price of the awarded Contract is: $______ [note if subject to unit prices, or cost-plus] 

[ ] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically. [revise if multiple copies accompany the Notice of Award]

☐ a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of this Notice of Award:

1. Deliver to Owner [____]counterparts of the Agreement, fully executed by Bidder.

2. Deliver with the executed Agreement(s) the Contract security [e.g., performance and payment bonds] and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.

3. Other conditions precedent (if any):

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

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner:

Authorized Signature

By: 
Title: 

Copy: Engineer
AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Long Creek Watershed Management District (“Owner”) and __________________________________________________________________________ (“Contractor”).

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: implementation of an in-stream habitat and floodplain restoration project for the Main Stem of Long Creek from Maine Mall Road downstream to Foden Road in South Portland, Maine.

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Long Creek – Main Stem Restoration Project, Long Creek Watershed Management District, South Portland, Maine.

ARTICLE 3 –

3.01 The part of the Project that pertains to the Work has been designed by Field Geology Services, LLC, P.O. Box 985, Farmington, Maine 04938 with engineering services provided by St. Germain Collins, Inc., 846 Main Street, Westbrook, Maine 04092 under subcontract to Field Geology Services, LLC.

3.02 The Owner has retained Chris Baldwin, P.E., Cumberland County Soil & Water Conservation District, 35 Main Street, Suite 3, Windham, Maine 04062 under subcontract to Field Geology Services, LLC, P.O. Box 985, Farmington, Maine 04938 (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Contract Times: Dates

A. In-stream construction Work will be complete on or before September 30, 2019. Work, other than in-stream construction Work will be substantially complete on or before October 15, 2019, and complete and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before October 31, 2019.
B. Parts of the Work shall be complete or substantially complete on or before the following Milestone(s):
   1. In-stream construction Work is to be complete on or before September 30, 2019;
   2. Work, other than in-stream construction Work, is to be substantially complete on or before October 15, 2019, and complete and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before October 31, 2019.

4.03 Special Damages
A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor’s failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.
B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:
A. For all Work other than Unit Price Work, a lump sum of: $__________.
   All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.
B. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) $__________.
C. For all Work, at the prices stated in Contractor’s Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments
A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress 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 15th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price
Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

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 Owner may withhold in accordance with the Contract
   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 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer’s estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 Final Payment

1. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate of seven percent per annum.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

   A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

   B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, 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 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 adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
E. Contractor has considered the information known to Contractor itself; 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; and (3) Contractor’s safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no 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.

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.

J. Contractor’s entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:
   1. This Agreement (pages 1 to 7, inclusive).
   2. Performance bond (pages 1 to 3, inclusive).
   3. Payment bond (pages 1 to 3, inclusive).
   4. General Conditions (pages 1 to 61, inclusive).
   5. Supplementary Conditions (pages 1 to 14, inclusive).
   7. Drawings (not attached but incorporated by reference) consisting of 14 sheets with each sheet bearing the following general title: “Main Stem Restoration Project, Long Creek, South Portland, Maine.”
   8. Addenda (numbers ___ to ___, inclusive).
   9. Exhibits to this Agreement (enumerated as follows):
      a. Contractor’s Bid (pages ___ to ___, inclusive).
   10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
      a. Notice to Proceed.
b. Work Change Directives.
c. Change Orders.
d. Field Orders.

B. The documents listed in Paragraph 9.01.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 provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 Terms
A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract
A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns
A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability
A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Contractor’s Certifications
A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. “corrupt practice” means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of
Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 Other Provisions

A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or “track changes” (redline/strikeout), or in the Supplementary Conditions.
IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on [_](which is the Effective Date of the Contract).

OWNER:    CONTRACTOR:

By:   By:    
Title:   Title:    
(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:  Attest:    
Title:   Title:    
Address for giving notices:  Address for giving notices:    
License No.:   (where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)
NOTICE TO PROCEED

Owner: Owner's Contract No.:
Contractor: Contractor’s Project No.:
Engineer: Engineer’s Project No.:
Project: Contract Name:

Effective Date of Contract:

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____________________, 20__]. [see Paragraph 4.01 of the General Conditions]

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is ________________, and the date of readiness for final payment is ________________] or [the number of days to achieve Substantial Completion is ________________, and the number of days to achieve readiness for final payment is ________________].

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer
PERFORMANCE BOND

CONTRACTOR (name and address):

SURETY (name and address of principal place of business):

OWNER (name and address):

CONSTRUCTION CONTRACT
   Effective Date of the Agreement:
   Amount:
   Description (name and location):

BOND
   Bond Number:
   Date (not earlier than the Effective Date of the Agreement of the Construction Contract):
   Amount:
   Modifications to this Bond Form:   None     See Paragraph 16

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

CONTRACTOR AS PRINCIPAL

Contractor’s Name and Corporate Seal

By: ____________________________ (seal)
   Signature

Print Name

Title

Attest:
   Signature

Title

SURETY

Surety’s Name and Corporate Seal

By: ____________________________ (seal)
   Signature (attach power of attorney)

Print Name

Title

Attest:
   Signature

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.
1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety’s obligation under this Bond shall arise after:

   3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor’s performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner’s notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety’s receipt of the Owner’s notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner’s right, if any, subsequently to declare a Contractor Default;

   3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

   3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety’s obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety’s expense take one of the following actions:

   5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

   5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

   5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

   5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

   5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

   7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

   7.2 additional legal, design professional, and delay costs resulting from the Contractor’s Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

   7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety’s liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:
PAYMENT BOND

CONTRACTOR (name and address):

SURETY (name and address of principal place of business):

OWNER (name and address):

CONSTRUCTION CONTRACT

Effective Date of the Agreement:  
Amount:  
Description (name and location):

BOND

Bond Number:  
Date (not earlier than the Effective Date of the Agreement of the Construction Contract):  
Amount:  
Modifications to this Bond Form:  

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

CONTRACTOR AS PRINCIPAL

________________________________________  (seal)
Contractor’s Name and Corporate Seal

By:  
Signature

Print Name

Title

Attest:  
Signature

Title

SURETY

________________________________________  (seal)
Surety’s Name and Corporate Seal

By:  
Signature (attach power of attorney)

Print Name

Title

Attest:  
Signature

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.
1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety’s obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner’s property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety’s expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety’s obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant’s obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety’s expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety’s failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney’s fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety’s total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney’s fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, the Contractor and the Owner, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. The Owner shall not be liable for the payment of any costs or expenses of any Claimant for the reasonable attorney’s fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic’s lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of “labor, materials, or equipment” that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor’s subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:
# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term’s singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. **Addenda**—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. **Agreement**—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. **Application for Payment**—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. **Bid**—The offer of aBidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. **Bidder**—An individual or entity that submits a Bid to Owner.

6. **Bidding Documents**—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. **Bidding Requirements**—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. **Change Order**—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. **Change Proposal**—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. **Claim**—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer’s decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer’s decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.
11. **Constituent of Concern**—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. **Contract**—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. **Contract Documents**—Those items so designated in the Agreement, and which together comprise the Contract.

14. **Contract Price**—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. **Contract Times**—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. **Contractor**—The individual or entity with which Owner has contracted for performance of the Work.

17. **Cost of the Work**—See Paragraph 13.01 for definition.

18. **Drawings**—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. **Effective Date of the Contract**—The date, indicated in the Agreement, on which the Contract becomes effective.

20. **Engineer**—The individual or entity named as such in the Agreement.

21. **Field Order**—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. **Hazardous Environmental Condition**—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. **Laws and Regulations; Laws or Regulations**—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. **Liens**—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. **Milestone**—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. **Notice of Award**—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. **Notice to Proceed**—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. **Owner**—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. **Progress Schedule**—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.

30. **Project**—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. **Project Manual**—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. **Resident Project Representative**—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.

33. **Samples**—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. **Schedule of Submittals**—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.

35. **Schedule of Values**—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.

36. **Shop Drawings**—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. **Site**—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. **Specifications**—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. **Subcontractor**—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. **Substantial Completion**—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended.
The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.

41. **Successful Bidder**—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. **Supplementary Conditions**—The part of the Contract that amends or supplements these General Conditions.

43. **Supplier**—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. **Technical Data**—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. **Underground Facilities**—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. **Unit Price Work**—Work to be paid for on the basis of unit prices.

47. **Work**—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. **Work Change Directive**—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 **Terminology**

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. **Intent of Certain Terms or Adjectives:**

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for
compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. Day:
   1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. Defective:
   1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
      a. does not conform to the Contract Documents; or
      b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
      c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. Furnish, Install, Perform, Provide:
   1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
   2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
   3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
   4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance
   A. Bonds: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
   B. Evidence of Contractor’s Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured
and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. Evidence of Owner’s Insurance: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 Copies of Documents

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 Before Starting Construction

A. Preliminary Schedules: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 Preconstruction Conference; Designation of Authorized Representatives

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete
and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor’s full responsibility therefor.

2. Contractor’s Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor’s Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 Electronic Transmittals

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient’s use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 Intent

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 Reference Standards

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard
specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies:

1. Contractor’s Verification of Figures and Field Measurements: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. Contractor’s Review of Contract Documents: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. Resolving Discrepancies:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

   a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
   
   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).
3.04 **Requirements of the Contract Documents**

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer’s written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 **Reuse of Documents**

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner’s express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

**ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK**

4.01 **Commencement of Contract Times; Notice to Proceed**

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 **Starting the Work**

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.
4.03 **Reference Points**

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer’s judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 **Progress Schedule**

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 **Delays in Contractor’s Progress**

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor’s performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor’s sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 Availability of Lands

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner’s interest therein as necessary for giving notice of or filing a mechanic’s or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor’s operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or
occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor’s performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. **Removal of Debris During Performance of the Work:** During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. **Cleaning:** Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. **Loading of Structures:** Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 **Subsurface and Physical Conditions**

A. **Reports and Drawings:** The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
3. Technical Data contained in such reports and drawings.

B. **Reliance by Contractor on Technical Data Authorized:** Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 **Differing Subsurface or Physical Conditions**

**A. Notice by Contractor:** If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

**B. Engineer’s Review:** After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner’s obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor’s resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer’s findings, conclusions, and recommendations.

**C. Owner’s Statement to Contractor Regarding Site Condition:** After receipt of Engineer’s written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer’s written findings, conclusions, and recommendations, in whole or in part.

**D. Possible Price and Times Adjustments:**

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
   a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
c. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
   a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
   b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor’s making such commitment; or
   c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor’s entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner’s issuance of the Owner’s written statement to Contractor regarding the subsurface or physical condition in question.

5.05 Underground Facilities

A. Contractor’s Responsibilities: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
   1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
   2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
      a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
      b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
      c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
      d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. Notice by Contractor: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in
connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. **Engineer’s Review**: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor’s resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer’s findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. **Owner’s Statement to Contractor Regarding Underground Facility**: After receipt of Engineer’s written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer’s written findings, conclusions, and recommendations in whole or in part.

E. **Possible Price and Times Adjustments**:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
   a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
   b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
   c. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times; and
   d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor’s entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner’s issuance of the Owner’s written statement to Contractor regarding the Underground Facility in question.

**5.06 Hazardous Environmental Conditions at Site**

A. **Reports and Drawings**: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
2. Technical Data contained in such reports and drawings.

B. **Reliance by Contractor on Technical Data Authorized:** Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or
such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner’s written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner’s own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible.

Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible.

Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 Performance, Payment, and Other Bonds

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor’s obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in “Companies Holding
Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 Insurance—General Provisions

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party’s full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party’s obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner’s termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party’s interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor’s interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor’s liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 Contractor’s Insurance

A. **Workers’ Compensation**: Contractor shall purchase and maintain workers’ compensation and employer’s liability insurance for:

1. claims under workers’ compensation, disability benefits, and other similar employee benefit acts.
2. United States Longshoreman and Harbor Workers’ Compensation Act and Jones Act coverage (if applicable).
3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor’s employees (by stop-gap endorsement in monopolist worker’s compensation states).
4. Foreign voluntary worker compensation (if applicable).

B. **Commercial General Liability—Claims Covered**: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor’s employees.
2. claims for damages insured by reasonably available personal injury liability coverage.
3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. **Commercial General Liability—Form and Content**: Contractor’s commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:
a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor’s contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, “Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured” or its equivalent.

D. Automobile liability: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. Umbrella or excess liability: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer’s liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. Contractor’s pollution liability insurance: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor’s operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. Additional insureds: The Contractor’s commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. Contractor’s professional liability insurance: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional
design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. General provisions: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor’s performance of the Work and Contractor’s other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 Owner’s Liability Insurance

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner’s option, may purchase and maintain at Owner’s expense Owner’s own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner’s liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner’s liability policies for any of Contractor’s obligations to the Owner, Engineer, or third parties.

6.05 Property Insurance

A. Builder’s Risk: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder’s risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder’s risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as “insureds.”

2. be written on a builder’s risk “all risk” policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss:
fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder’s risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder’s risk insurance.

8. allow for the waiver of the insurer’s subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. **Notice of Cancellation or Change:** All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
C. **Deductibles**: The purchaser of any required builder’s risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. **Partial Occupancy or Use by Owner**: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder’s risk policy, or through Contractor) will provide notice of such occupancy or use to the builder’s risk insurer. The builder’s risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder’s risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder’s risk insurance.

E. **Additional Insurance**: If Contractor elects to obtain other special insurance to be included in or supplement the builder’s risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor’s expense.

F. **Insurance of Other Property**: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 **Waiver of Rights**

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder’s risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner’s property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment...
of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder’s risk insurance and any other property insurance applicable to the Work.

6.07 Receipt and Application of Property Insurance Proceeds

A. Any insured loss under the builder’s risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder’s risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

7.01 Supervision and Superintendence

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 Labor; Working Hours

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work
outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner’s written consent, which will not be unreasonably withheld.

7.03 **Services, Materials, and Equipment**

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 **“Or Equals”**

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or equal” item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an “or equal” item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

   a. in the exercise of reasonable judgment Engineer determines that:

      1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

      2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

      3) it has a proven record of performance and availability of responsive service; and

      4) it is not objectionable to Owner.

   b. Contractor certifies that, if approved and incorporated into the Work:

      1) there will be no increase in cost to the Owner or increase in Contract Times; and

      2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
B. **Contractor’s Expense**: Contractor shall provide all data in support of any proposed “or equal” item at Contractor’s expense.

C. **Engineer’s Evaluation and Determination**: Engineer will be allowed a reasonable time to evaluate each “or-equal” request. Engineer may require Contractor to furnish additional data about the proposed “or-equal” item. Engineer will be the sole judge of acceptability. No “or-equal” item will be ordered, furnished, installed, or utilized until Engineer’s review is complete and Engineer determines that the proposed item is an “or-equal”, which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. **Effect of Engineer’s Determination**: Neither approval nor denial of an “or-equal” request shall result in any change in Contract Price. The Engineer’s denial of an “or-equal” request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. **Treatment as a Substitution Request**: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

### 7.05 Substitutes

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
   a. shall certify that the proposed substitute item will:
      1) perform adequately the functions and achieve the results called for by the general design,
      2) be similar in substance to that specified, and
      3) be suited to the same use as that specified.
   b. will state:
      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
      2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:
  
  1) all variations of the proposed substitute item from that specified, and
  2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. **Engineer’s Evaluation and Determination:** Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer’s review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer’s determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. **Special Guarantee:** Owner may require Contractor to furnish at Contractor’s expense a special performance guarantee or other surety with respect to any substitute.

D. **Reimbursement of Engineer’s Cost:** Engineer will record Engineer’s costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. **Contractor’s Expense:** Contractor shall provide all data in support of any proposed substitute at Contractor’s expense.

F. **Effect of Engineer’s Determination:** If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer’s denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

### 7.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor’s Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such
proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner’s requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor’s own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07Patent Fees and Royalties

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless the Indemnified Parties from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08Permits

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor’s Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.09Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10Laws and Regulations

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor’s compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners,
employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor’s responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor’s obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor’s Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 Record Documents

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner’s safety programs, if any. The Supplementary Conditions identify any Owner’s safety programs that are applicable to the Work.
D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor’s safety program with which Owner’s and Engineer’s employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor’s duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor’s duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 Safety Representative

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 Hazard Communication Programs

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 Emergencies

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 Shop Drawings, Samples, and Other Submittals

A. Shop Drawing and Sample Submittal Requirements:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
   a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
   b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor’s responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor’s obligations under the Contract Documents with respect to Contractor’s review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. **Submittal Procedures for Shop Drawings and Samples:** Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

   1. **Shop Drawings:**
      a. Contractor shall submit the number of copies required in the Specifications.
      b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

   2. **Samples:**
      a. Contractor shall submit the number of Samples required in the Specifications.
      b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer’s review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. **Other Submittals:** Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. **Engineer’s Review:**

   1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer’s review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer’s review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer’s review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer’s review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer’s review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer’s review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer’s receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. Resubmittal Procedures:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer’s time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer’s charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer’s charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 Contractor’s General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor’s warranty and guarantee.

B. Contractor’s warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
2. normal wear and tear under normal usage.

C. Contractor’s obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor’s obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal;
6. the issuance of a notice of acceptability by Engineer;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor’s performance obligations to Owner for the Work described in the assigned contract.

7.18 Indemnification

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers’ compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer’s officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 Delegation of Professional Design Services

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer’s review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer’s review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 Other Work

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner’s employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner’s employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner’s employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise
make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others’ work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor’s Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor’s Work. Contractor’s failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor’s Work except for latent defects and deficiencies in such other work.

8.02 Coordination

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner’s employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
2. an itemization of the specific matters to be covered by such authority and responsibility; and
3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 Legal Relationships

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner’s employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor’s rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner’s contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
C. When Owner is performing other work at or adjacent to the Site with Owner’s employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor’s failure to take reasonable and customary measures with respect to Owner’s other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor’s failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor’s actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER’S RESPONSIBILITIES

9.01 Communications to Contractor
A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 Replacement of Engineer
A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer’s status under the Contract Documents shall be that of the former Engineer.

9.03 Furnish Data
A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 Pay When Due
A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 Lands and Easements; Reports, Tests, and Drawings
A. Owner’s duties with respect to providing lands and easements are set forth in Paragraph 5.01.
B. Owner’s duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
C. Article 5 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 Insurance
A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.
9.07 **Change Orders**

A. Owner’s responsibilities with respect to Change Orders are set forth in Article 11.

9.08 **Inspections, Tests, and Approvals**

A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 **Limitations on Owner’s Responsibilities**

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor’s failure to perform the Work in accordance with the Contract Documents.

9.10 **Undisclosed Hazardous Environmental Condition**

A. Owner’s responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 **Evidence of Financial Arrangements**

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner’s obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 **Safety Programs**

A. While at the Site, Owner’s employees and representatives shall comply with the specific applicable requirements of Contractor’s safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

**ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION**

10.01 **Owner’s Representative**

A. Engineer will be Owner’s representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner’s representative during construction are set forth in the Contract.

10.02 **Visits to Site**

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor’s executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer’s efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer’s visits and observations are subject to all the limitations on Engineer’s authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer’s visits or observations of Contractor’s Work, Engineer will not supervise, direct,
control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 **Project Representative**

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer’s consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 **Rejecting Defective Work**

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 **Shop Drawings, Change Orders and Payments**

A. Engineer’s authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer’s authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer’s authority as to Change Orders is set forth in Article 11.

D. Engineer’s authority as to Applications for Payment is set forth in Article 15.

10.06 **Determinations for Unit Price Work**

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 **Decisions on Requirements of Contract Documents and Acceptability of Work**

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 **Limitations on Engineer’s Authority and Responsibilities**

A. Neither Engineer’s authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws
and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor’s failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer’s review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 Compliance with Safety Program

A. While at the Site, Engineer’s employees and representatives will comply with the specific applicable requirements of Owner’s and Contractor’s safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. Change Orders:

   a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

   b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive’s effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. Field Orders: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with
the design concept of the completed Project as a functioning whole as indicated by the
Contract Documents. Such changes will be accomplished by a Field Order and will be binding
on Owner and also on Contractor, which shall perform the Work involved promptly. If
Contractor believes that a Field Order justifies an adjustment in the Contract Price or
Contract Times, or both, then before proceeding with the Work at issue, Contractor shall
submit a Change Proposal as provided herein.

11.02 Owner-Authorized Changes in the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or
from time to time, order additions, deletions, or revisions in the Work. Such changes shall be
supported by Engineer’s recommendation, to the extent the change involves the design (as set
forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters.
Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as
to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change
Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work
involved; or, in the case of a deletion in the Work, promptly cease construction activities with
respect to such deleted Work. Added or revised Work shall be performed under the applicable
conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to
undertake work that Contractor reasonably concludes cannot be performed in a manner
consistent with Contractor’s safety obligations under the Contract Documents or Laws and
Regulations.

11.03 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the
Contract Times with respect to any work performed that is not required by the Contract
Documents, as amended, modified, or supplemented, except in the case of an emergency as
provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an
adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim
for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents,
   then by application of such unit prices to the quantities of the items involved (subject to the
   provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents,
   then by a mutually agreed lump sum (which may include an allowance for overhead and
   profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents
   and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost
   of the Work (determined as provided in Paragraph 13.01) plus a Contractor’s fee for
   overhead and profit (determined as provided in Paragraph 11.04.C).

C. Contractor’s Fee: When applicable, the Contractor’s fee for overhead and profit shall be
determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various
   portions of the Cost of the Work:
a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor’s fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor’s fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor’s fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor’s fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor’s fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor’s progress.

11.06 Change Proposals

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. Procedures: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
2. **Engineer’s Action:** Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor’s supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer’s inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. **Binding Decision:** Engineer’s decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. **Resolution of Certain Change Proposals:** If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 **Execution of Change Orders**

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner’s acceptance of defective Work under Paragraph 14.04 or Owner’s correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer’s recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 **Notification to Surety**

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor’s responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.
ARTICLE 12 – CLAIMS

12.01 Claims

A. Claims Process: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer’s decisions regarding Change Proposals;
2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. Submittal of Claim: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor’s knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. Review and Resolution: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. Mediation:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.
3. Owner and Contractor shall each pay one-half of the mediator’s fees and costs.

E. Partial Approval: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. Denial of Claim: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final
and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. Final and Binding Results: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 Cost of the Work

A. Purposes for Determination of Cost of the Work: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. Costs Included: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers’ compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers’ field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:
   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor’s employees incurred in discharge of duties connected with the Work.
   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
   c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
   d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
   e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
   f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor’s fee.
   g. The cost of utilities, fuel, and sanitary facilities at the Site.
   h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
   i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. **Costs Excluded:** The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor’s officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents,
expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at
the Site or in Contractor’s principal or branch office for general administration of the Work
and not specifically included in the agreed upon schedule of job classifications referred to in
Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and
other compensation excluded here are to be considered administrative costs covered by the
Contractor’s fee.

2. Expenses of Contractor’s principal and branch offices other than Contractor’s office at the
Site.

3. Any part of Contractor’s capital expenses, including interest on Contractor’s capital
employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly
employed by any of them or for whose acts any of them may be liable, including but not
limited to, the correction of defective Work, disposal of materials or equipment wrongly
supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not
specifically and expressly included in Paragraph 13.01.B.

D. Contractor’s Fee: When the Work as a whole is performed on the basis of cost-plus, Contractor’s
fee shall be determined as set forth in the Agreement. When the value of any Work covered by a
Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is
determined on the basis of Cost of the Work, Contractor’s fee shall be determined as set forth in
Paragraph 11.04.C.

E. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to
this Article 13, Contractor will establish and maintain records thereof in accordance with generally
accepted accounting practices and submit in a form acceptable to Engineer an itemized cost
breakdown together with supporting data.

13.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the
Contract Documents and shall cause the Work so covered to be performed for such sums and by
such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of
materials and equipment required by the allowances to be delivered at the Site, and all
applicable taxes; and

2. Contractor’s costs for unloading and handling on the Site, labor, installation, overhead,
profit, and other expenses contemplated for the cash allowances have been included in the
Contract Price and not in the allowances, and no demand for additional payment on account
of any of the foregoing will be valid.

C. Contingency Allowance: Contractor agrees that a contingency allowance, if any, is for the sole use
of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer
to reflect actual amounts due Contractor on account of Work covered by allowances, and the
Contract Price shall be correspondingly adjusted.
13.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor’s overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer’s preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer’s written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer’s written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

   1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
   2. there is no corresponding adjustment with respect to any other item of Work; and
   3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 Access to Work

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor’s safety procedures and programs so that they may comply therewith as applicable.

14.02 Tests, Inspections, and Approvals

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
2. to attain Owner’s and Engineer’s acceptance of materials or equipment to be incorporated in the Work;
3. by manufacturers of equipment furnished under the Contract Documents;
4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor’s purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor’s expense unless Contractor had given Engineer timely notice of Contractor’s intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

A. Contractor’s Obligation: It is Contractor’s obligation to assure that the Work is not defective.

B. Engineer’s Authority: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. Notice of Defects: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. Correction, or Removal and Replacement: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. Preservation of Warranties: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner’s special warranty and guarantee, if any, on said Work.

F. Costs and Damages: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or
replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer’s confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner’s evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 Uncovering Work

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer’s observation, and then replace the covering, all at Contractor’s expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer’s request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor’s full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 Owner May Stop the Work

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the
benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 **Owner May Correct Defective Work**

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor’s services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner’s representatives, agents and employees, Owner’s other contractors, and Engineer and Engineer’s consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor’s defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner’s rights and remedies under this Paragraph 14.07.

**ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

15.01 **Progress Payments**

A. **Basis for Progress Payments**: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. **Applications for Payments**:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner’s interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor’s legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer’s reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer’s recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer’s observations of the executed Work as an experienced and qualified design professional, and on Engineer’s review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer’s knowledge, information and belief:

   a. the Work has progressed to the point indicated;
   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
   c. the conditions precedent to Contractor’s being entitled to such payment appear to have been fulfilled in so far as it is Engineer’s responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer’s review of Contractor’s Work for the purposes of recommending payments nor Engineer’s recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or
   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
   c. for Contractor’s failure to comply with Laws and Regulations applicable to Contractor’s performance of the Work, or
   d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer’s opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer’s opinion to protect Owner from loss because:
   a. the Work is defective, requiring correction or replacement;
   b. the Contract Price has been reduced by Change Orders;
   c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
   d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
   e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer’s recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. Reductions in Payment by Owner:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
   a. claims have been made against Owner on account of Contractor’s conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor’s conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
   b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
   c. Contractor has failed to provide and maintain required bonds or insurance;
   d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
   e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
   f. the Work is defective, requiring correction or replacement;
   g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
   h. the Contract Price has been reduced by Change Orders;
i. an event that would constitute a default by Contractor and therefore justify a
termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor’s failure to achieve
Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has
delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge
of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on
the written recommendations of Engineer, Owner will give Contractor immediate written
notice (with a copy to Engineer) stating the reasons for such action and the specific amount
of the reduction, and promptly pay Contractor any amount remaining after deduction of the
amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any
adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons
for such action. The reduction imposed shall be binding on Contractor unless it duly submits
a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner’s refusal of payment was not justified, the
amount wrongfully withheld shall be treated as an amount due as determined by Paragraph
15.01.C.1 and subject to interest as provided in the Agreement.

15.02 Contractor’s Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished
under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2)
all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of
payment by Owner.

15.03 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify
Owner and Engineer in writing that the entire Work is substantially complete and request that
Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to
Owner and Engineer an initial draft of punch list items to be completed or corrected before final
payment.

B. Promptly after Contractor’s notification, Owner, Contractor, and Engineer shall make an
inspection of the Work to determine the status of completion. If Engineer does not consider the
Work substantially complete, Engineer will notify Contractor in writing giving the reasons
therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a
preliminary certificate of Substantial Completion which shall fix the date of Substantial
Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary
certificate during which to make written objection to Engineer as to any provisions of the
certificate or attached punch list. If, after considering the objections to the provisions of the
preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer
will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in
writing that the Work is not substantially complete, stating the reasons therefor. If Owner does
not object to the provisions of the certificate, or if despite consideration of Owner’s objections
Engineer concludes that the Work is substantially complete, then Engineer will, within said 14
days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion.
(with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner’s use or occupancy of the Work following Substantial Completion, review the builder’s risk insurance policy with respect to the end of the builder’s risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner’s use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 Partial Use or Occupancy

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor’s performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder’s risk or other property insurance.

15.05 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or
agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 Final Payment

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
   a. all documentation called for in the Contract Documents;
   b. consent of the surety, if any, to final payment;
   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
   d. a list of all disputes that Contractor believes are unsettled; and
   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer’s observation of the Work during construction and final inspection, and Engineer’s review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor’s other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer’s recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer’s opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
Completion of Work: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer’s written recommendation of final payment.

Payment Becomes Due: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer’s recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 Waiver of Claims

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor’s failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor’s continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner’s written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner’s written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to
such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor’s obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor’s persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
3. Contractor’s disregard of Laws or Regulations of any public body having jurisdiction; or
4. Contractor’s repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other
professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor’s services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 Owner May Terminate For Convenience

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 Contractor May Stop Work or Terminate

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor’s stopping the Work as permitted by this paragraph.
ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

A. Disputes Subject to Final Resolution: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. Final Resolution of Disputes: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
2. agree with the other party to submit the dispute to another dispute resolution process; or
3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 Computation of Times

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 Limitation of Damages

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any
claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 **No Waiver**

A. A party’s non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 **Survival of Obligations**

A. All representations, indemifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 **Controlling Law**

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 **Headings**

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.
SECTION 00800

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2013 Edition), hereinafter called the General Conditions, and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

SC-1 DEFINITIONS AND TERMINOLOGY

The terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

SC-1.01.A.3 Application for Payment

Add the following language to the end of paragraph 1.01.A.3 of the General Conditions:

The Application for Payment form to be used on this Project is EJCDC No. C-620.

SC-1.01.A.8 Change Order

Add the following language to the end of paragraph 1.01.A.8:

The Change Order form to be used on this Project is EJCDC No. C-941.

SC-1.01.A.28 Owner

Add the following to the end of paragraph 1.01.28 of the General Conditions:

Owner is referred to as Grantee in certain sections of these Contract Documents. Owner and Grantee are one and the same.

SC-1.01.A.49 Non-Resident Contractor

Add a new paragraph immediately after paragraph 1.01.A.48 of the General Conditions, which is to read as follows:

49. Non-Resident Contractor–
   a. A person who is not a resident in the State where the proposed construction is to be located;
   b. Any partnership that has no member thereof resident in the State where the proposed construction is to be located; or
   c. Any corporation established under laws other than those of the State in which the proposed construction is located.

SC-2 PRELIMINARY MATTERS

SC-2.01 Delivery of Bonds and Evidence of Insurance

Add a new paragraph immediately after paragraph 2.01.C of the General Conditions:
D. **Non-Resident Contractor:** The Contractor, if a corporation established under laws other than the State in which the proposed construction is located, shall file with the Owner, notice of the name of its resident attorney, appointed as required by the laws of the State in which the proposed construction is located. The Contractor, if a resident of a State other than that in which the proposed construction is located and not a corporation, shall file, at the time of execution of the Agreement, with the Owner a written appointment of a resident of the State in which the construction is located, having an office or place of business therein, to be his true and lawful attorney upon whom all lawful processes in any actions or proceedings against him may be served; and in such writing, which shall set forth said attorney's place of residence, shall agree that any lawful process against him which is served on said attorney shall be of the same legal force and validity as if served on him and that the authority shall continue in force so long as any liability remains outstanding against him in said State. The power of attorney shall be filed in the office of the Secretary of State if required, and copies certified by the Secretary shall be sufficient evidence thereof. Such appointment shall continue in force until revoked by an instrument in writing, designating in a like manner some other person upon whom such processes may be served, which instrument shall be filed in the manner provided herein for the original appointment.

**SC-4 COMMENCEMENT AND PROGRESS OF THE WORK**

**SC-4.05 Delays in Contractor’s Progress**

Add the following new paragraph, immediately after subparagraph 4.05.G of the General Conditions:

H. The Contractor shall not be entitled to an adjustment to the Contract Price or Contract Times for delays caused by unmarked or mis-marked utilities when those utilities are owned by others.

**SC-5 AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS**

**HAZARDOUS ENVIRONMENTAL CONDITIONS**

**SC-5.02 Use of Site and Other Areas**

Delete paragraph 5.02.A.2 of the General Conditions in its entirety and insert the following in its place:

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Long Creek Watershed landowners and operators who enter into an “Agreement Between Participating Landowners and the Long Creek Watershed Management District” (hereinafter “Participating Landowners), the owners of properties upon which Work will be performed, if they are not Participating Landowners, and Engineer, and the officers, directors, managers, members, partners, employees, agents, consultants and subcontractors of each and any of them, and their successors and assigns (collectively, the “Indemnified Parties”) from and against
any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor’s performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

SC-5.03 Subsurface and Physical Conditions

Add the following new paragraph(s) immediately after paragraph 5.03.B of the General Conditions:

5.03.C In the preparation of Drawings and Specifications, Engineer or Engineer’s Consultants relied upon the following reports of explorations and tests of subsurface conditions at the Site:


SC-5.06 Hazardous Environmental Conditions at Site

Add the following to the end of paragraph 5.06.I of the General Conditions following the word “responsible”:

, and further provided that Nothing in these Standard General Conditions of the Construction Contract or in the Contract Documents or Bidding Forms is intended, or shall be construed, to constitute a waiver of any defense, immunity or limitation of liability that may be available to a governmental entity, or any of its officers, agents or employees, pursuant to the Eleventh Amendment to the Constitution of the United States of America, the Maine Constitution, the Maine Tort Claims Act (14 M.R.S.A. § 8101 et seq.), any state or federal statute, the common law or any privileges or immunities as may be provided by law, all of which are expressly retained by Owner.

SC-6 BONDS AND INSURANCE

SC-6.01 Performance, Payments, and Other Bonds

Add the following new paragraph immediately after paragraph 6.01.F of the General Conditions:

G. A qualifying bonding company is an insurance, bonding, and/or surety company that is (a) licensed or approved by the State of Maine Department of Business Regulation, Bureau of Insurance, to do business in the State of Maine AND (b) listed on the most recent Federal Department of the Treasury listing of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies.

SC-6.03 Contractor’s Insurance

Delete paragraph 6.03.C.7 of the General Conditions in its entirety and insert the following in its place:
7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 04 13 and CG 20 37 04 13 (together); or their equivalent.

Add the following new paragraphs immediately after paragraph 6.03.J of the General Conditions:

K. Failure of the Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of the Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.

L. Certificates of Insurance of the type and in the amounts required shall be delivered to the Owner prior to the commencement of any work.

M. Extension endorsements must provide "Additional Insured" status to certificate holders including the Owners, Engineer, Participating Landowners (the “Participating Landowners”, the Participating Landowners list is attached in the Appendix A hereto) who have entered into an “Agreement Between Participating Landowner and the Long Creek Watershed Management District” and other landowners. The parties identified in SC-5.04 B-1.5. below must be listed as additional insureds for General Liability and Auto Liability at a minimum. A copy of the extension endorsement is to be attached to the certificate.

N. The limits of liability for insurance required by paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

a. Workers’ Compensation, and related coverages under Paragraphs 6.03.A of the General Conditions:

   i. State: Statutory
   ii. Applicable Federal (e.g., Longshoremen’s) Statutory
   iii. Employer’s Liability $ 2,000,000

b. Contractor’s General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions which shall include completed operations and product liability coverages:

   i. General Aggregate $ 2,000,000
   ii. Products - Completed Operations Aggregate $ 2,000,000
   iii. Personal and Advertising Injury $ 2,000,000
   iv. Each Occurrence (Bodily Injury and Property Damage) $ 2,000,000

c. Property Damage liability insurance will provide Explosion, Collapse, and
Underground coverages where applicable.

d. Automobile Liability under Paragraph 6.03.D of the General Conditions:

i. Bodily Injury:
   - Each Person $ 2,000,000
   - Each Accident $ 2,000,000

ii. Property Damage:
   - Each Accident $ 2,000,000

iii. Combined Single Limit of $ 2,000,000

e. The Contractual Liability coverage required by paragraph 6.03.C.2 of the General Conditions shall provide coverage for not less than the following amounts:

i. Bodily Injury:
   - Each Person $ 2,000,000
   - Each Accident $ 2,000,000

ii. Property Damage:
   - Each Accident $ 2,000,000
   - Annual Aggregate $ 2,000,000

f. All insurance required by this paragraph 6.03, except for worker’s compensation insurance, shall name the Participating Landowners listed as Appendix A hereto; the owners of properties upon which work will be performed, if they are not Participating Landowners; Owners; Engineer and their respective directors, officers, managers, members, employees, and agents as additional insureds.

g. Extension endorsements must provide "Additional Insured" status to certificate holders including the Owners and Engineer. The parties identified in SC-6.03.N.g. above must be listed as additional insureds for General Liability and Auto Liability at a minimum. A copy of the extension endorsement is to be attached to the certificate.

SC-6.03.I.3 Delete "at least 10 days" and replace with "at least 60 days."

SC-6.05 Property Insurance

Add the following new paragraph immediately after paragraph 6.05.F of the General Conditions:

G. Owner will not purchase or maintain property insurance upon the Work at the Site.

Add the following new paragraph immediately after paragraph 6.05.G of the General Conditions:

H. Property insurance to the full insurable value of the Work in accordance with Paragraph 5.6 of the General Conditions will be provided by the Contractor in the form of 100% Builder’s Risk, completed value.
SC-6.06  Waiver of Rights

Delete paragraph 6.06.A of the General Conditions in its entirety and insert the following in its place:

A.  Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owners, Participating Landowners, the owners and operators of properties upon which Work will be performed, if they are not Participating Landowners, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, members, managers, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, members, managers, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Contractor as trustee or otherwise payable under any policy so issued.

Delete paragraph 6.06.B of the General Conditions in its entirety and insert the following in its place:

B.  Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, members, managers, employees, agents, consultants and subcontractors of each and any of them for:

Delete paragraph 6.06.C of the General Conditions in its entirety and insert the following in its place:

C.  Any insurance policy maintained by Owners covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, members, managers, employees, agents, consultants and subcontractors of each and any of them.

SC-7  CONTRACTOR’S RESPONSIBILITIES

SC-7.01  Supervision and Superintendence
Delete paragraph 7.01.B of the General Conditions in its entirety and insert the following in its place:

B. At all times during the progress of the Work, Contractor shall assign a competent resident Superintendent who shall not be replaced without seven days advance written notice to Owner and Engineer and prior authorization by Owner, except under extraordinary circumstances. The Contractor’s written notice shall provide a complete explanation of the reasons for replacement. Replacement of the Superintendent to assume responsibility for another project or position within the Contractor’s organization is not an acceptable reason for replacement. The Superintendent will be Contractor’s representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the Superintendent shall be binding on Contractor. The Contractor’s Superintendent shall not oversee or prepare bids for other work while present on the Site. If the resident Superintendent is not on Site, the owner may, at the owner’s discretion, reduce payments to the contractor, based on the Superintendent’s hourly rate established in the Contractor’s bid.

SC-7.02 Labor; Working Hours

Add the following sentences to the end of paragraph 7.02.B of the General Conditions.

Regular working hours shall be 7:00 AM to 7:00 PM, Monday through Saturday. If the Contractor or Subcontractors, wish to work outside of these hours, written authorization must be obtained in advance from the Long Creek Watershed Management District.

Add the following paragraph immediately after paragraph 7.02.B of the General Conditions:

C. The Contractor shall not occupy public right of way, other than in designated staging areas, with equipment or materials during legal holidays.

SC-7.06 Concerning Subcontractors, Suppliers, and Others

Add the following sentences at the end of paragraph 7.06.D of the General Conditions:

The Contractor shall deliver to the Engineer and Owner, for review and acceptance within five days of bid opening, a listing of the Subcontractors, Suppliers or entities for the work listed below:

1. Subcontracts exceeding $10,000.
2. Subcontracts exceeding $100,000.

Replace paragraph 7.06.N in its entirety with the following:

N. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other individual or entity, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor, Supplier, or other individual or entity.

Add the following paragraph immediately after Paragraph 7.06.O of the General Conditions:

P. The Contractor shall not award work valued at more than fifty (50%) percent of the
Contract Price to Subcontractor(s), without prior written approval of the Owner.

**SC-7.07 Patent Fees and Royalties**

Add the following at the end of paragraph 7.07.B of the General Conditions after the word “copyrights”:

, provided that Nothing in these Standard General Conditions of the Construction Contract or in the Contract Documents or Bidding Forms is intended, or shall be construed, to constitute a waiver of any defense, immunity or limitation of liability that may be available to a governmental entity, or any of its officers, agents or employees, pursuant to the Eleventh Amendment to the Constitution of the United States of America, the Maine Constitution, the Maine Tort Claims Act (14 M.R.S.A. § 8101 et seq.), any state or federal statute, the common law or any privileges or immunities as may be provided by law, all of which are expressly retained by Owner.

**SC-7.08 Permits**

Add the following paragraph immediately after paragraph 7.08.A of the General Conditions:

B. The project Site and scope of work are within the jurisdiction of the Maine Department of Environmental Protection (Maine DEP), the City of South Portland (City), and the U.S. Army Corps of Engineers (USACOE). The following permits are required:

1. Maine DEP – Natural Resources Protection Act, Section 12 and 13, Permit-By-Rule;
2. City – Flood Management Permit and Site Plan and Shoreland Zoning Review;
3. USACOE – Wetland Delineation and General Permit; and

C. Owner shall be responsible for obtaining the Natural Resources Protection Act permit from the State of Maine, Department of Environmental Protection, the Site Plan and Shoreland Zoning approvals from the City of South Portland, and the General Permit from the USACOE. Permit applications have been filed, on behalf of Owner, with the Maine DEP, the City, and USACOE, and the applications are currently under review with respective agencies. Owner, not the Contractor, will be responsible for all final coordination and securing the first three permits listed above. Minor modifications and additions to the Drawings may be requested during the review process as a condition for final approval. Any changes and additions requested will be issued as an Addendum to the Bid Documents.

D. The Contractor is responsible for applying for and obtaining the fourth permit item, the Maine Construction General Permit, and shall be responsible for obtaining all other construction permits and licenses and for complying with all requirements.

E. All work must adhere to the standard general practices and requirements of the issuing agencies.

F. Construction may not proceed until the Maine DEP, USACOE, and the City have reviewed, approved, and issued the appropriate permits.

**SC-7.09 Taxes**
Add a new paragraph immediately after Paragraph 7.09.A of the General Conditions:

B. Owner is exempt from payment of sales and compensating use taxes of the State on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner’s exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-7.18 Indemnification

Delete paragraph 7.18.A of the General Conditions in its entirety and insert the following in its place:

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless the Indemnified Parties from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

Delete paragraph 7.18.B of the General Conditions in its entirety and insert the following in its place:

In any and all claims against the Indemnified Parties by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers’ compensation acts, disability benefit acts, or other employee benefit acts.

Add a new paragraph immediately after Paragraph 7.18.C. of the General Conditions:

D. The foregoing indemnity expressly extends to claims of injury, death, or damage to employees of Contractor, Subcontractor or Supplier. In claims against any person or entity indemnified under this Section by an employee of Contractor, Subcontractor, or Supplier, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for Contractor, Subcontractor or Supplier under workers' compensation acts,
disability benefit acts or other employee benefit acts. Contractor expressly waives immunity under workers’ compensation laws for the purposes of this indemnity provision.

SC-10 ENGINEER’S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

Add a new paragraph immediately after paragraph 10.03.A of the General Conditions:

B. Owner may designate a Resident Project Representative to assist Owner in observing the performance of the Work. It shall be the duty of the Resident Project Representative to observe the Work and render decisions as to its acceptability. The responsibilities and limitations of Authority of the Resident Project Representative shall be the same as for Owner set forth in Article 9 of the General Conditions.

SC-10.04 Rejecting Defective Work

Replace the words “will have authority to” with “shall” in the first sentence of Section 10.4.A.

SC-11 AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

SC-11.02 Owner-Authorized Changes in the Work

At the end of paragraph 11.02.A, add the following sentence:

Failure to promptly proceed with the Work shall be considered a substantial violation of the contract.

SC-11.04 Change of Contract Price

At the end of subparagraph 11.04.C.2.b, prior to the semicolon, add the following words:

calculated on Subcontractor’s actual cost before Subcontractor’s fee is added.

At the end of subparagraph 11.04.C.2.c, prior to the semicolon, add the following words:

calculated on the actual cost of the work performed before any tier Subcontractor’s fee is added. The total fee on actual work shall not exceed 15%.

SC-15 PAYMENTS TO CONTRACTORS; SET-OFFS; COMPLETION; CORRECTIVE PERIOD

SC-15.01 Progress Payments

Replace paragraph 15.01.B.1 of the General Conditions with the following:

B. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract
Documents, including but not limited to, lien waivers for payment after the first payment requisition. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect Owner’s interest therein, all of which must be satisfactory to Owner.

Add the following sentence at the end of paragraph 15.01.B.3:

No payments will be made that would deplete the retainage. Owner shall return any funds that are required for retainage or invest the retainage for the benefit of the Contractor.

Add the following sentences at the end of paragraph 15.01.C.1

An application resubmitted after corrections will be considered a new application for the purpose of determining the Engineer’s review period and the date that payment becomes due. The Engineer’s review will not commence until complete and correct Certified Payrolls have been submitted for work performed during the period of the pay requisition.

Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer’s recommendations will be presented to the Owner for consideration. If the Owner finds the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty-five (35) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-15.06 Final Payment

Add a new paragraph immediately after paragraph 15.06.B.1 of the General Conditions:

2. Two (2) percent of the total contract amount as reflected on the final Application for Payment shall be retained by Owner during the Correction Period. This retainage shall be held by Owner in an account without interest accruing to Contractor. All amounts otherwise due Contractor will be paid as described in paragraph 14.07.C of the General Conditions. At the end of the correction period, Owner shall pay Contractor the retainage less any amounts deducted for failure of Contractor to perform as outlined in Section 13 of the General Conditions.

SC-17 FINAL RESOLUTION AND DISPUTES

Article 17 of the General Conditions shall be deleted in its entirety and replaced with the following:

Except as otherwise agreed by the parties in writing, all disputes, claims, counterclaims, and other matters in question between the Owner and the Contractor arising out of or relating to this agreement shall be decided by a Maine court of competent jurisdiction. This Agreement is made and shall be construed under the laws of the State of Maine.
Except as otherwise expressly agreed by the parties in writing exclusive venue for any such civil action shall be in Maine.

SC-18 MISCELLANEOUS

Add the following paragraph after paragraph 18.08

18.09  Project Sign

The CONTRACTOR shall provide and erect a PROJECT sign as detailed and specified. Submit sign layout and design to OWNER prior to purchasing. The location of the sign shall be as directed by the ENGINEER. No other CONTRACTOR, SUBCONTRACTOR or material signs will be permitted on the sign. The CONTRACTOR shall maintain and keep the PROJECT sign in good condition until the work is completed when the sign will be removed. All other signs to be erected on the Site shall be approved by the ENGINEER. Provide adequate supports for sign as Site conditions may require and keep sign a proper distance above prevailing grade to permit public viewing.

Temporary Construction Sign

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<tr>
<th>Project Title</th>
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<tbody>
<tr>
<td>(include Town/District name)</td>
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<tr>
<td>Engineer:</td>
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<tr>
<td>Contractor:</td>
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</table>

MINIMUM SIGN DIMENSIONS: 1200 x 2400 x 19 MM (4’ x 8’ x 3/4”)
EXTERIOR PLYWOOD (A-B GRADE)
WHITE BACKGROUND

MINIMUM LETTERING SIZE: 5 CM (2-INCHES)

SC-19 ENVIRONMENTAL REQUIREMENTS

Add the following Article 19:

A. The Contractor shall comply with State and local environmental protection requirements including, but not limited to, the following:

1. Control of dust from excavations and spillage of materials on highways.
2. No burning will be allowed.
3. Control of erosion and washing of materials from excavated slopes and embankments.
4. Prevention of stream turbidity from dewatering and general earthwork operation.
5. In general, construction of necessary temporary erosion and sedimentation control devices will be in conformance with the latest edition of Maine DEP's *Maine Erosion and Sediment Control Best Management Practices (BMPs)*.

6. The Contractor shall not dispose of excess materials on lands designated or classified as wetlands by the U.S. Dept. of Fish and Wildlife. The Contractor is advised to contact the Corps of Engineers, the State Department of Environmental Protection and related agencies prior to selecting any or all sites for disposal of excess materials. Any sediment removed from the existing detention pond shall be disposed of at a licensed processing facility.

SC-20 ADDITIONAL INSTRUCTION AND DETAIL DRAWINGS

Add the following Article 20:

A. The Contractor may be furnished additional instructions and detail drawings, by the Engineer, as necessary to carry out the Work required by the Contract Documents.

B. The additional drawings and instruction thus supplied will become a part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

END OF SECTION
## Contractor's Application for Payment No.

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<th>Application</th>
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<th>Contractor's Project No.:</th>
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### Application For Payment

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<td>3. Current Contract Price (Line 1 ± 2)</td>
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<td>4. TOTAL COMPLETED AND STORED TO DATE</td>
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<td>(Column F total on Progress Estimates)</td>
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5. RETAINAGE:
   a. X Work Completed | $ |
   b. X Stored Material | $ |
   c. Total Retainage (Line 5.a + Line 5.b) | $ |

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<th>6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)</th>
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<td>7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)</td>
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<td>8. AMOUNT DUE THIS APPLICATION</td>
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<td>9. BALANCE TO FINISH, PLUS RETAINAGE</td>
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<td>(Column G total on Progress Estimates + Line 5.c above)</td>
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### Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:

1. All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment.
2. Title to all Work, materials, and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interests, or encumbrances); and
3. All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

### Payment of:
- $ (Line 8 or other - attach explanation of the other amount)
- (Line 8 or other - attach explanation of the other amount)

### Contractor Signature

By: Date:  
is recommended by:  
(Engineer)  (Date)

### Funding or Financing Entity (if applicable)

Approved by:  
(Owner)  (Date)
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<th>C (This Period)</th>
<th>D (Materials Presently Stored (not in C or D))</th>
<th>E (Total Completed and Stored to Date (C + D + E))</th>
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**Total**
For (Contract):  
Application Number:  
Application Period:  
Application Date:  

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Totals
# Stored Material Summary

**For (Contract):**

**Application Number:**

**Application Period:**

**Application Date:**

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<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<td>Bid Item No.</td>
<td>Supplier Invoice No.</td>
<td>Submittal No. (with Specification Section No.)</td>
<td>Storage Location</td>
<td>Description of Materials or Equipment Stored</td>
<td>Stored Previously</td>
<td>Subtotal Amount Completed and Stored to Date (D + E)</td>
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<td>Date Placed into Storage (Month/Year)</td>
<td>Amount Stored this Month ($)</td>
<td>Date (Month/Year)</td>
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**Totals**
CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: 
Contractor: 
Engineer: 
Project: 

Owner's Contract No.: 
Contractor's Project No.: 
Engineer's Project No.: 
Contract Name: 

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; see Paragraph 15.03.D of the General Conditions.]

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: ____________________________
**Work Change Directive No.**

<table>
<thead>
<tr>
<th>Date of Issuance:</th>
<th>Effective Date:</th>
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<tr>
<td>Owner:</td>
<td>Owner’s Contract No.:</td>
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<tr>
<td>Contractor:</td>
<td>Contractor’s Project No.:</td>
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<tr>
<td>Engineer:</td>
<td>Engineer’s Project No.:</td>
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<tr>
<td>Project:</td>
<td>Contract Name:</td>
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Contractor is directed to proceed promptly with the following change(s):

**Description:**

**Attachments:** [List documents supporting change]

**Purpose for Work Change Directive:**
Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: [check one or both of the following]

- [ ] Non-agreement on pricing of proposed change.
- [ ] Necessity to proceed for schedule or other Project reasons.

**Estimated Change in Contract Price and Contract Times (non-binding, preliminary):**

- **Contract Price**: $ [increase] [decrease].
- **Contract Time**: [increase] [decrease].

**Basis of estimated change in Contract Price:**

- [ ] Lump Sum
- [ ] Unit Price
- [ ] Cost of the Work
- [ ] Other

**RECOMMENDED:**

By:  
Engineer (Authorized Signature)
Title:  
Date:

**AUTHORIZED BY:**

By:  
Owner (Authorized Signature)
Title:  
Date:

**RECEIVED:**

By:  
Contractor (Authorized Signature)
Title:  
Date:

**Approved by Funding Agency (if applicable):**

By:  
Title:  
Date:
Change Order No.  

Date of Issuance: __________________________  Effective Date: __________________________

Owner: __________________________  Owner's Contract No.: __________________________
Contractor: __________________________  Contractor's Project No.: __________________________
Engineer: __________________________  Engineer's Project No.: __________________________
Project: __________________________  Contract Name: __________________________

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: [List documents supporting change]

| CHANGE IN CONTRACT PRICE | CHANGE IN CONTRACT TIMES  

[Note changes in Milestones if applicable] |
<table>
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<tr>
<td>Original Contract Price:</td>
<td>Original Contract Times:</td>
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<td>$ __________________________</td>
<td>Substantial Completion: __________________________</td>
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<tr>
<td>[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___:</td>
<td>Ready for Final Payment: __________________________</td>
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<td>$ __________________________</td>
<td>__________________________ days or dates</td>
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<tr>
<td>Contract Price prior to this Change Order:</td>
<td>Contract Times prior to this Change Order:</td>
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<td>$ __________________________</td>
<td>Substantial Completion: __________________________</td>
</tr>
<tr>
<td>[Increase] [Decrease] of this Change Order:</td>
<td>Ready for Final Payment: __________________________</td>
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<td>$ __________________________</td>
<td>__________________________ days or dates</td>
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<tr>
<td>Contract Price incorporating this Change Order:</td>
<td>Contract Times with all approved Change Orders:</td>
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<td>$ __________________________</td>
<td>Substantial Completion: __________________________</td>
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<td>__________________________ days or dates</td>
<td>Ready for Final Payment: __________________________</td>
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**RECOMMENDED:**  
By: __________________________  By: __________________________  By: __________________________
Title: __________________________  Title: __________________________  Title: __________________________
Date: __________________________  Date: __________________________  Date: __________________________

**ACCEPTED:**  
By: __________________________  By: __________________________  By: __________________________
Owner (Authorized Signature)  Contractor (Authorized Signature)  __________________________
Title: __________________________  Title: __________________________  __________________________
Date: __________________________  __________________________  __________________________

Approved by Funding Agency (if applicable):

By: __________________________  Date: __________________________
Title: __________________________  __________________________

EJCDC® C-941, Change Order.  
Prepared and published 2013 by the Engineers Joint Contract Documents Committee.  
Page 1 of 1
STATE OF ___________________________,

COUNTY OF _______________________,

Before me, the undersigned, a ____________________________
(Notary Public, Justice of the Peace or Alderman)

in and for said County and State personally appeared ____________________________
(individual, partner, or duly authorized representative of Corporate Contractor)

according to law deposes and says that the cost of all labor, materials and equipment and outstanding
claims and indebtedness of whatever nature arising out of the performance of the Contract between

__________________________
Long Creek Watershed Management District
(Owner)

and ____________________________
(Contractor)

of ____________________________

DATED ____________________________ for the construction of the Long Creek Watershed Management
District Long Creek Main Stem Restoration Project have been paid in full.

__________________________
(Individual, Partner or duly authorized representative of Corporate Contractor)

Sworn to and subscribed before me

this __________ day of ________, 2015.

_________________________________
CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS that ____________________________ (Contractor)
of ______________________, County of __________________ and State of ____________________
do hereby acknowledge that ____________________________ (Contractor) has this day had, and received of ____________________________ (Owner) and from ____________________________ the sum of One Dollar and other valuable considerations in full and complete satisfaction and payment of all sums of money owed, payable and belonging to ____________________________ by any means whatsoever, for on account of a Contract Agreement between ____________________________ (Owner) and ____________________________ (Contractor) dated ____________________________ (Agreement Date) for ____________________________ (Project)

NOW, THEREFORE, the said ____________________________ (Contractor)

(for myself, my heirs, executors and administrators) (for itself, its successors and assigns)
do/does, by these presents remise, release, quit-claim and forever discharge ____________________________ (Owner) ____________________________ , of and from all claims and demands, arising from or in connection with the said contract dated ____________________________ (Agreement Date) and of and from all, and all manner of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specialties, covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in law or equity, or otherwise, against ____________________________ its successors and assigns, which (I, my heirs, executors, or administrators) (it, its successors and assigns) ever had, now have or which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can, shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the beginning of recorded time to the date of these presents.

IN WITNESS WHEREOF, ____________________________ (Contractor)

has caused these presents to be duly executed this ______ day of ______________________ 20 ______

Signed, Sealed and Delivered in the presence of:

______________________________________________________________
DIVISION 1
GENERAL REQUIREMENTS
ST.GERMAIN COLLINS
SPECIAL PROVISIONS

SECTION 01000

SPECIAL PROVISIONS

1.1 STANDARD SPECIFICATIONS

A. The Owner has adopted certain portions of the “State of Maine, Department of Transportation, Standard Specifications of the Maine Department of Transportation, November 2014 Edition,” including all current additions or modifications thereof, including the most recent version of the “Repair Specifications,” Supplemental Specifications (corrections, additions, and revisions to standard specifications) (hereinafter referred to as “Standard Specifications”). Whenever in the Standard Specifications the Commission; Maine Department of Transportation (MDOT), State Highway Commission of the State of Maine; or any reference to the State Highway Commission or its engineers is mentioned, the intent and meaning shall mean the Owner. A copy of the Standard Specifications can be found online at: www.maine.gov/mdot/contractors/publications/standardspec/.

1.2 GENERAL CONDITIONS

A. LCWMD has adopted the “Standard General Conditions of the Construction Contract” as prepared by the Engineers Joint Contract Documents Committee, EJCDC C-700, Rev. 1 (2013), with the Supplementary Conditions found in Division 0 of the Project Manual Bidding Requirements and Specifications. EJCDC C-700 and the Supplementary Conditions replace the following Divisions of the MDOT Standard Specifications:

1. Division 100 – General Conditions; except those provisions contained in the Special Provisions and Supplemental Technical Specifications.

2. Division 100 – Appendix A of the MDOT Standard Specifications.

1.3 SPECIAL PROVISIONS AND SUPPLEMENTAL TECHNICAL SPECIFICATIONS

A. Supplemental Technical Specifications are additions, modifications, and deletions to the Standard Specifications.

B. Special Provisions are specifications for additional items not covered in the Standard Specifications.

C. The Supplemental Technical Specifications are provided in standard Construction Specifications Institute (CDI) three-part format.

1.4 NON-WORKING HOURS

A. Backfill or cover open trenches and move all equipment and materials from the public streets during non-working hours.

B. Do not occupy public street, other than in designated and secured staging areas, with equipment or materials during non-working hours, weekends, or legal holidays.

1.5 NOTIFICATION OF PROPERTY OWNER(S)
LONG CREEK – MAIN STEM RESTORATION PROJECT  
LONG CREEK WATERSHED MANAGEMENT DISTRICT  
SOUTH PORTLAND, MAINE

A. Notify LCWMD sufficiently in advance of any construction affecting property access.
B. Make every effort to maintain Site access and property owner’s daily operations for the duration of the Project.

1.6 PROTECTION OF TREES
A. Preserve all trees on the Project as indicated on the Drawings and Supplemental Technical Specifications. Any trees damaged by the Contractor’s operations must be repaired using approved tree dressing or paint in accordance with the MDOT Standard Specifications.

1.7 STAGING AREAS
A. Staging areas are to be provided as indicated in the Drawings and in consultation with the Engineer and Property Owner.
B. All staging areas to be enclosed with six-foot tall temporary fencing.
C. All costs associated with the use, maintenance, and restoration of the staging areas are incidental to the Contract and no separate payment will be made.
D. The following provisions and restrictions apply to each staging area used by the Contractor.
   1. Install and maintain erosion control measures including sediment barriers and the downgradient limits of any disturbed areas.
   2. Install a stabilized construction entrance(s) for access to the Site.
   3. As necessary, install stabilized haul roads in the staging area(s) suitable for vehicles using the area.
   4. Prior to Substantial Completion of the Project, remove all materials from the staging area and restore surfaces to preconstruction grades and conditions.
   5. Protect all trees or landscaping within the staging area.
   6. Do not remove trees from the staging areas. Any tree damaged or removed must be replaced by the Contractor with a new tree of the same size and species at no additional cost to Owner.

1.8 SHEETING AND BRACING
A. If deemed necessary by the Contractor, any sheeting, shoring and/or bracing required for the protection of structures and utilities and for the installation of drainage will not be paid for separately but shall be considered as incidental to the appropriate bid item. The Contractor is responsible for the design and implementation of any excavation support required. This work shall be considered a subsidiary obligation of the contract for which no specific payment will be made.

1.9 DEWATERING
A. Dewatering is required for surface and below grade construction, especially in areas where the
water table is below the ground surface. Excavations and all other parts of the construction Site shall be dewatered and kept free of standing water and muddy conditions as necessary for the proper execution of the work.

B. Furnish, install, operate, and maintain all drains, sumps, pumps, casings, well points, and all other equipment required to properly dewater the Site as specified in the Supplemental Technical Specifications, Section 02241, Dewatering and Surface Water Control, and the Drawings.

C. Submit, in writing to the Engineer, a proposed plan for dewatering before commencing with any construction activity for which dewatering may be required. Acceptance of this plan or the waiving of the plan requirement will not relieve the Contractor of the responsibilities for completing the specified work.

D. Waste water from the dewatering operations must be pre-treated prior to disposal to remove sediment and must meet applicable regulatory discharge requirements.

E. The Contractor is responsible for any testing, treatment, and/or off-Site disposal of the water in accordance with applicable Federal, State, and local regulatory requirements.

F. Provide the Engineer 24 hours-notice before any dewatering commences.

1.10 OCCUPATIONAL SAFETY AND HEALTH

A. All work shall be performed with equipment, methods, and use of personnel in conformance with the pertinent Occupational Safety and Health Act requirements and the regulations for construction as specified by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), as currently amended.

1.11 SETTING OF PIPES TO LINE AND GRADE

A. Laser beam equipment shall be used for laying storm drain and/or sanitary sewer pipe.

B. Frequent checks shall be made to assure close adherence to line and grade.

C. Setting pipes to grade by use of “pop” levels or carpenter levels is not permitted.

1.12 EXTENT OF OPEN EXCAVATION

A. The extent of excavation open at any one time shall be controlled by OSHA regulations and by existing conditions and location of work area.

1.13 TRAFFIC OFFICERS

A. Comply with all City traffic control regulations and, if necessary, hire and pay police officers and vehicles necessary for maintenance of traffic.

B. The City’s Police Department requires 48 hours-notice for any Police detail onsite.

1.14 LIMITATION OF OPERATIONS

A. Conduct all work in such a manner and in such sequence as will assure the least interference with
facility traffic. Do not open up work to the prejudice or detriment of work already started. The Engineer may require the Contractor to finish a section on which work is in progress before work is started on any additional sections, if finishing such section is essential to public convenience.

1.15 PAVEMENT REPLACEMENT

A. Repair any pavement that has experienced excess settlement, cracking, or opening of pavement joints. Repair may include overlay, removal of unacceptable material and complete replacement, joint sealing, or re-cutting pavement as required. This work may be necessary after final inspection of the work and prior to expiration of the maintenance bond. This work shall be done at no additional cost to the Owner.

1.16 UNAUTHORIZED USE OF FIRE HYDRANTS

A. In conformance with the Maine State Department of Human Services, the Portland Water District (PWD) requires the use of an approved air gap or reduced pressure zone back flow-device to assure the protection of the public water supply when filling tank trucks, street sweepers, jet machines or any other related equipment, or any other needs that require a connection to a public or private hydrant.

B. If requesting water use from a public hydrant, private contractors are required to apply to the PWD for a hydrant meter and back flow device installations. The approved applicants will pay for the installation and removal of the hydrant meter and back flow device and all water recorded by the meter.

C. PWD considers any other connection or usage from a public or private hydrant as an unauthorized use of a hydrant and a theft of services.

D. All Contractors must apply to PWD for the installation of a back-flow device and meter for each usage.

E. PWD will operate the hydrant and install, remove, and relocate the back-flow device and meter as needed. A valve is provided at the connection so the applicant can control the water without operating the hydrant. Please note size of meter requested (2” or 1”).

F. PWD can be contacted at (207) 774-5961. All cost associated with these requirements is incidental to the contract.

1.17 UTILITY COORDINATION

A. The Project includes construction in close proximity to water, gas, electrical, and telecommunication utility service and transmission lines. The Contractor is responsible for notifying utility representatives of the anticipated construction schedule. The Contractor is responsible for all utility coordination, protection of existing infrastructure, and any damages to existing utilities as a result of the work, at no additional cost to the Owner.

B. The Contractor shall ascertain the location of existing utilities and any other necessary information by direct inquiry at the office of the following utility owners. The completeness of this listing is not guaranteed by Owner:

Electric: Central Maine Power Company, 162 Canco Road, Portland, ME 04103, (207) 791-
CONTRACTOR PARKING

A. The Contractor and its employees are not permitted to park on public streets.

B. The Contractor shall not park in the parking lots of private properties abutting the Site unless authorized by the property owner. The cost of parking on private property is incidental to the contractor’s mobilization and no separate payment will be made.

IN-STREAM ADDITIONS

A. The Contractor is responsible for the proper inspection and maintenance of the work as indicated on the Drawings and specified in the Supplemental Technical Specifications, Section 02950, for a period of one year from the date of Substantial Completion.

B. Extend the maintenance period until satisfactory operation is established.

LANDSCAPE AND SEED MAINTENANCE

A. The Contractor is responsible for the proper inspection, watering, establishment, and maintenance of the all landscape and seeded areas as indicated on the Drawings and specified in the Supplemental Technical Specifications, Sections 02900, 02924, and 02930, for a period of one year from the date of Substantial Completion.

END OF SECTION
LONG CREEK – MAIN STEM RESTORATION PROJECT
LONG CREEK WATERSHED MANAGEMENT DISTRICT
SOUTH PORTLAND, MAINE

SECTION 01100

SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

2. Contractor's use of Site.
3. Work sequence.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes the following:

1. Restoration of the Main Stem of Long Creek. Including but not limited to the following:
   a. Site clearing;
   b. Erosion control and maintenance;
   c. Temporary gravel access roads;
   d. Earthwork for detention basin berm removal, rough and finish grading;
   e. Material hauling and disposal;
   f. Invasive species removal and disposal;
   g. Wood additions to stream and floodplain;
   h. Cobble and gravel additions to stream;
   i. Gravel mounds with plantings to floodplain;
   j. Repair of two existing embankment failures;
   k. Loam and seed;
   l. Tree and shrub plantings;
   m. Site cleanup and restoration; and
   n. Temporary traffic control.

2. Alternate: Removal of approximately 200-linear feet of sheet-metal pile. Work includes, but is
LONG CREEK – MAIN STEM RESTORATION PROJECT
LONG CREEK WATERSHED MANAGEMENT DISTRICT
SOUTH PORTLAND, MAINE

not limited to, the following:

a. Cut sheets off at ground level;

b. Remove sheets from floodplain;

c. Dispose or recycle sheets off Site;

d. Site cleanup and restoration; and

e. Temporary traffic control.

B. Perform Work under Lump Sum Contract with Owner according to Conditions of Contract.

1.3 CONTRACTOR'S USE OF SITE

A. Limit use of Site to allow:

1. Owner occupancy; and

2. Use of Site by the public.

B. Construction Operations: Limited to areas indicated on Drawings.

1. Coordinate and schedule such operations with Owner/Engineer to minimize disruptions.

C. Utility Outages and Shutdown:

1. If necessary, coordinate and schedule electrical and other utility outages with Owner.

1.4 WORK SEQUENCE

A. Construct Work as indicated on the Drawings.

B. Sequencing of Construction Plan: Before start of construction, submit three copies of construction plan regarding phasing of mobilization, staging, demolition, dewatering, and construction of new Work for acceptance by Owner. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.5 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.
B. Preconstruction meeting.
C. Progress meetings.
D. Preinstallation meetings.
E. Closeout meeting.
F. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

C. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.

D. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Engineer will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Engineer, Owner, Resident Project Representative, Construction Manager, and Contractor.

C. Minimum Agenda:

1. Safety discussion;
2. Execution of Owner-Contractor Agreement;
3. Submission of executed bonds and insurance certificates;
4. Distribution of Contract Documents;
5. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule;

6. Designation of personnel representing parties in Contract, and Engineer;

7. Communication procedures;

8. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures;

9. Scheduling;

10. Critical Work sequencing;

11. Use of premises by Owner and Contractor;

12. Construction facilities and controls;

13. Temporary utilities;

14. Survey and layout;

15. Security and housekeeping procedures;

16. Schedules;

17. Procedures for testing;

18. Procedures for maintaining record documents;

19. Requirements for startup of equipment; and

20. Required Engineer field observations during construction period.

D. Construction Manager: Record minutes and distribute copies to participants within two days after meeting, to Engineer, Owner, and those affected by decisions made.

1.4 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Contractors and suppliers, Engineer, Owner, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:

1. Safety discussion;
LONG CREEK – MAIN STEM RESTORATION PROJECT
LONG CREEK WATERSHED MANAGEMENT DISTRICT
SOUTH PORTLAND, MAINE

2. Review minutes of previous meetings;
3. Review of Work progress;
4. Field observations, problems, and decisions;
5. Identification of problems impeding planned progress;
6. Review of submittal schedule and status of submittals;
7. Review of off-Site fabrication and delivery schedules;
8. Maintenance of Progress Schedule;
9. Corrective measures to regain projected schedules;
10. Planned progress during succeeding work period;
11. Coordination of projected progress;
12. Maintenance of quality and work standards;
13. Effect of proposed changes on Progress Schedule and coordination; and
14. Other business relating to Work.

E. Construction Manager: Record minutes and distribute copies to participants within two days after meeting, to Engineer, Owner, and those affected by decisions made.

1.5 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene pre-installation meetings at Project Site before starting Work of specific Section.
B. Require attendance of parties directly affecting, or affected by, Work of specific Section.
C. Notify engineer four days in advance of meeting date.
D. Prepare agenda and preside over meeting:
   1. Review conditions of installation, preparation, and installation procedures; and
   2. Review coordination with related Work.

1.6 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.
B. Attendance Required: Contractor Construction Manager, Contractor, Engineer, Owner, and others appropriate to agenda.
C. Notify Engineer four days in advance of meeting date.

D. Minimum Agenda:
   1. Contractor's inspection of Work;
   2. Contractor's preparation of an initial "punch list";
   3. Procedure to request Architect/Engineer inspection to determine date of Substantial Completion;
   4. Completion time for correcting deficiencies;
   5. Inspections by authorities having jurisdiction;
   6. Partial release of retainage;
   7. Final cleaning;
   8. Preparation for final inspection;
   9. Closeout submittals:
      a. Project record documents;
      b. Affidavits;
   10. Final Application for Payment;
   11. Contractor's demobilization of Site; and
   12. Maintenance.

E. Record minutes and distribute copies to participants within two days after meeting, to Engineer, and those affected by decisions made.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.1 ALTERATION PROCEDURES

A. Designated areas of construction will be occupied for normal operations during progress of construction. Cooperate with Owner, property owners, and tenants in scheduling operations to minimize conflict and to permit continuous usage.
   1. Perform Work not to interfere with operations of occupied areas.
   2. Clean landowner and tenant occupied areas daily. Clean spillage, overspray, and heavy collection of sediment in landowner and tenant occupied areas immediately.

B. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace
and restore at completion.

C. Remove unsuitable material.

D. Remove debris and abandoned items.

E. Patch or replace portions of existing Site surfaces that are damaged, during construction.

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittals.
B. Quality assurance.
C. Bar chart schedules.
D. Review and evaluation.
E. Updating schedules.
F. Distribution.

1.2 SUBMITTALS

A. Within 10 days after date of established in Notice to Proceed, submit proposed preliminary schedule defining planned operations for the duration of Work.

B. Participate in review of preliminary schedule and complete schedule jointly with Engineer and Owner.

C. Within five days after joint review, submit final proposed Project schedule.

D. Submit updated schedules via email with each Application for Payment, or every 14 days.

E. Schedule Updates:

1. Overall percent complete, projected and actual;

2. Completion progress by listed activity and sub activity, to within five working days prior to submittal;

3. Changes in Work scope and activities modified since submittal;

4. Delays in submittals or resubmittals, deliveries, or Work;

5. Adjusted or modified sequences of Work;

6. Other identifiable changes; and

7. Revised projections of progress and completion.
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F. Narrative Progress Report:

1. Submit with each monthly submission of Progress Schedule;

2. Summary of Work completed during the past period between reports;

3. Work planned during the next period;

4. Explanation of differences between summary of Work completed and Work planned in previously submitted report;

5. Current and anticipated delaying factors and estimated impact on other activities and completion milestones; and

6. Corrective action taken or proposed.

1.3 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel specializing in scheduling with two years' minimum experience in scheduling construction work of complexity comparable to the Project.

B. Contractor's Administrative Personnel: two years' minimum experience in using and monitoring schedules on comparable projects.

1.4 BAR CHART SCHEDULES

A. Format: Bar chart Schedule, to include at least:

1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:
   a. Subcontract Work;
   b. Major delivery dates including required lead times;
   c. Move-in and other preliminary activities;
   d. Project closeout and cleanup; and
   e. Work sequences, constraints, and milestones.

2. Listings identified by Specification Section number.

3. Identification of the following:
   a. Horizontal time frame by month, and week;
   b. Duration, early start, and completion for each activity and subactivity; and
   c. Critical activities.
1.5 REVIEW AND EVALUATION

A. Participate in joint review and evaluation of schedules with Engineer at each submittal.

B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.

C. After review, revise schedules incorporating results of review, and resubmit within two days.

1.6 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.

C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

D. Upon approval of a Change Order, include the change in the next schedule submittal.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect.

1.7 DISTRIBUTION

A. Following joint review, distribute copies of updated schedules to Contractor's Project Site file, to Subcontractors, suppliers, Engineer, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION
SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Definitions.
B. Submittal procedures.
C. Construction progress schedules.
D. Proposed product list.
E. Product data.
F. Electronic CAD files of Project Drawings.
G. Shop Drawings.
H. Samples.
I. Other submittals.
J. Test reports.
K. Certificates.
L. Manufacturer's instructions.
M. Construction photographs.
N. Contractor review.
O. Engineer review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer-accepted form.
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B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project and submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.

F. For each submittal for review, allow five days.

G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Engineer review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized nor processed.

L. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with the Special Provisions, Section 01323, Construction Progress Schedules.

1.5 PROPOSED PRODUCT LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit electronic submittals via email as PDF electronic files.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement
manufacturers' standard data to provide information specific to this Project.

D. After review, produce copies and distribute according to "Submittal Procedures" Article and for
record documents described in the Special Provisions, Section 01700, Execution and Closeout
Requirements.

1.7 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop
Drawings for the Project. Use for other Projects or purposes is not allowed.

B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:

1. Use of files is solely at receiver's risk. Engineer does not warrant accuracy of files. Receiving
files in electronic form does not relieve receiver of responsibilities for measurements,
dimensions, and quantities set forth in Contract Documents. In the event of ambiguity,
discrepancy, or conflict between information on electronic media and that in Contract
Documents, notify Engineer of discrepancy and use information in hard-copy Drawings and
Specifications.

2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and
as-built conditions. Receiver is responsible for determining and complying with these
conditions and for incorporating addenda and modifications.

3. User is responsible for removing information not normally provided on Shop Drawings and
removing references to Contract Documents. Shop Drawings submitted with information
associated with other trades or with references to Contract Documents will not be reviewed
and will be immediately returned.

4. Receiver shall not hold Engineer responsible for data or file clean-up required to make files
usable, nor for error or malfunction in translation, interpretation, or use of this electronic
information.

5. Receiver shall understand that even though Engineer has computer virus scanning software to
detect presence of computer viruses, there is no guarantee that computer viruses are not
present in files or in electronic media.

6. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall
hold Engineer harmless against costs, losses, or damage caused by presence of computer virus
in files or media.

1.8 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Engineer for assessing conformance with
information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location
of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by
a Professional Engineer responsible for designing components shown on Shop Drawings.

1. Include signed and sealed calculations to support design.

2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.

3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit electronic submittals via email as PDF electronic files.

E. After review, produce copies and distribute according to this Section and the provisions for record documents described in the Special Provisions, Section 01700, Execution and Closeout Requirements.

1.9 SAMPLES

A. Samples: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:
   1. Submit to Engineer for aesthetic, color, and finish selection.
   2. Submit Samples of finishes, textures, and patterns for Engineer selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Engineer will retain one Sample.

F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in the Special Provision, Section 01700, Execution and Closeout Requirements.

1.10 OTHER SUBMITTALS

A. Closeout Submittals: Comply with the Special Provisions, Section 01700, Execution and Closeout Requirements.

B. Permits: Within 15 days after date established in Notice to Proceed, submit a list of permits and
licenses to be obtained, identifying the granting agency and the required date of permit submittal.

1.11 TEST REPORTS

A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation /application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Engineer in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 CONSTRUCTION PHOTOGRAPHS

A. As requested, provide photographs of Site and construction throughout progress of Work.

B. At a minimum, each month submit photographs with Application for Payment.

C. Photographs: digital .jpeg or .tiff files submitted via email.

D. Identify each photo by name and location.

E. Digital Images: Deliver complete set of digital image electronic files on CD-ROM to Owner with Project record documents. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as sensor, uncropped.

1. Digital Images: Uncompressed TIFF format, produced by digital camera with minimum sensor size of 4.0 megapixels, and image resolution of not less than 1024 by 768 pixels.

2. Date and Time: Include date and time in filename for each image.
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1.15 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.

B. Contractor: Responsible for:

1. Determination and verification of materials including manufacturer's catalog numbers.
2. Determination and verification of field measurements and field construction criteria.
3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
4. Determination of accuracy and completeness of dimensions and quantities.
5. Confirmation and coordination of dimensions and field conditions at Site.
6. Construction means, techniques, sequences, and procedures.
7. Safety precautions.
8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.16 ENGINEER REVIEW

A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.

B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, Construction Change Directive, or Work Change Directive.

E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.
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PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control.
B. Tolerances.
C. References.
D. Testing and inspection services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

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

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are
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required by applicable codes.

B. Conform to reference standard by date of issue current as of date of Contract Documents except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.

   1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time specialist and responsible officer.

   2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer.

   1. Laboratory: Authorized to operate in State of Maine.

   2. Laboratory Staff: Maintain full-time specialist on staff to review services.

   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.

D. Reports shall be submitted by independent firm to Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.

   1. Submit final report indicating correction of Work previously reported as noncompliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

   1. Notify Engineer and independent firm 24 hours before expected time for operations.
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requiring services.

2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:

1. Test Samples of mixes submitted by Contractor.

2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.

3. Perform indicated sampling and testing of products according to specified standards.

4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.

6. Perform additional tests required by Engineer.

7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit two copies of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:

1. Date issued;

2. Project title and number;

3. Name of inspector;

4. Date and time of sampling or inspection;

5. Identification of product and Specification Section;

6. Location in Project;

7. Type of inspection or test;

8. Date of test;
9. Results of tests; and


\textbf{J. Limits on Testing Authority:}

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency or laboratory may not approve or accept any portion of the Work.

3. Agency or laboratory may not assume duties of Contractor.

4. Agency or laboratory has no authority to stop the Work.

\textbf{PART 2 PRODUCTS – Not Used}

\textbf{PART 3 EXECUTION – Not Used}

\textbf{END OF SECTION}
SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities under construction management agreement.
B. Temporary electricity.
C. Communication services.
D. Temporary water service.
E. Temporary sanitary facilities.
F. Field offices.
G. Vehicular access.
H. Parking.
I. Progress cleaning and waste removal.
J. Project identification.
K. Traffic regulation.
L. Fire-prevention facilities.
M. Barriers.
N. Enclosures and fencing.
O. Security.
P. Water control.
Q. Dust control.
R. Erosion and sediment control.
S. Noise control.
T. Pollution control.
U. Removal of utilities, facilities, and controls.
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1.2 REFERENCES

A. ASTM International:


1.3 TEMPORARY FACILITIES UNDER CONSTRUCTION MANAGEMENT AGREEMENT

A. Temporary Provisions Provided by Contractor:

1. Temporary barriers, barricades, and fencing;

2. Temporary field offices;

3. Cleaning during construction;

4. Access roads and approaches;

5. Temporary sanitary facilities;

6. Temporary telephone and internet service;

7. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls;

8. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public;

9. Temporary tree and plant protection; and

10. Temporary provisions for protection of installed Work.

1.4 TEMPORARY ELECTRICITY (NOT ANTICIPATED)

A. If necessary, provide portable generator(s) for construction operations. Generator location to be determined by Contractor. Provide suitable, flexible power cords as required for portable construction tools and equipment.

1.5 TEMPORARY WATER SERVICE (NOT ANTICIPATED)

A. Provide and pay for suitable quality water service as needed to maintain specified conditions during construction operations.
A. Coordination and agency approval for public water use is the responsibility of the Contractor.

1.6 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.7 FIELD OFFICES AND STORAGE

A. A field office is not required.

B. Storage Areas: If necessary, size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in the Special Provisions, Section 01600, Product Requirements.

C. Maintenance and Cleaning:

1. Removal: At completion of Work remove storage facilities and debris. Restore areas to same or better condition as original condition.

1.8 VEHICULAR ACCESS

A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.

B. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.

C. Locate as indicated on Drawings.

D. Provide unimpeded access for emergency vehicles.

E. Provide and maintain access to fire hydrants and control valves free of obstructions.

F. Provide means of removing mud from vehicle wheels before entering streets.

G. Keep construction traffic on existing on-Site roads to a minimum.

H. Tracked vehicles are not allowed on paved areas.

1.9 PARKING

A. Arrange for temporary parking areas to accommodate construction personnel.

B. Locate as approved by Owner.

C. If Site space is not adequate, provide additional off-Site parking.

D. Use of designated areas of public street and driveways used for construction traffic is not
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permitted. Tracked vehicles are not allowed on paved areas.

E. Use Owner-approved areas of existing parking facilities for construction personnel only.

F. Do not allow heavy vehicles or construction equipment in parking areas.

G. Maintenance:

1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.

2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

H. Removal, Repair:

1. Remove temporary materials and construction at Substantial Completion.

2. Remove temporary underground Work and compacted materials to depth of two feet; fill and grade Site as indicated.

3. Repair existing facilities damaged by use, to original condition.

I. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Collect and remove waste materials, debris, and rubbish from Site periodically and dispose of off Site.

1.11 PROJECT IDENTIFICATION

A. Project Identification Sign as indicated in the Supplementary Conditions, Section 00800.

B. Maintenance: Maintain clean signs and supports; repair deterioration and damage.

C. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.12 TRAFFIC REGULATION

A. Signs, Signals, and Devices:

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2. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.

3. Flag Person Equipment: As required by authorities having jurisdiction.

B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

B. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

C. Haul Routes:
   1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.

C. Traffic Signs:
   1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

   2. Relocate signs as Work progresses, to maintain effective traffic control.

D. Removal:
   1. Remove equipment and devices when no longer required.

   2. Repair damage caused by installation.

   3. Remove post settings to depth of two feet.

1.13 FIRE-PREVENTION FACILITIES

A. Prohibit smoking within the limit of work. Designate area on Site where smoking is permitted.

B. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
   1. Provide minimum of one fire extinguisher in every construction trailer and storage shed.

1.14 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades required by authorities having jurisdiction for public rights-of-way.

C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain as indicated on Drawings.
   1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
2. Replace trees and plants damaged by construction operations.

D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.15 ENCLOSURES AND FENCING

A. Construction: Contractor's option.

B. Provide six-foot-high fence around construction Site; equip with vehicular gates with locks.

1.16 SECURITY

A. Security Program:
   1. Protect Work on existing premises from theft, vandalism, and unauthorized entry.
   2. Initiate program in coordination with Owner's existing security system at Project mobilization.
   3. Maintain program throughout construction period until Owner's acceptance precludes need for Contractor's security.

B. Entry Control:
   1. Restrict entrance of persons and vehicles to Project Site.
   2. Allow entrance only to authorized persons.
   3. Maintain log of workers and visitors and make available to Owner on request.
   4. Control entrance of persons and vehicles related to Owner's operations.

C. Restrictions:
   1. Do not work days indicated in Owner-Contractor Agreement.

1.17 STORMWATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.

B. Protect Site from puddles or running water. Provide erosion controls as required to protect Site from soil erosion.

1.18 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere and into landowner and tenant occupied areas.
C. Apply water as the primary means of dust control. Apply as needed such that dust is prevented.

1.19 EROSION AND SEDIMENT CONTROL

A. See Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.

B. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

C. Minimize surface area of bare soil exposed at one time.

D. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

E. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.

F. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

G. Comply with sediment and erosion control plan indicated on Drawings.

1.20 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise from and noise produced by construction operations.

1.21 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.22 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.

B. Remove underground installations to minimum depth of two feet. Grade Site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary Work.

A. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS – Not Used
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PART 3 EXECUTION – Not Used

END OF SECTION
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SECTION 01600  
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.
B. Product delivery requirements.
C. Product storage and handling requirements.

1.2 PRODUCTS

A. At minimum, comply with specified requirements and reference standards.
B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
D. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.
E. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products according to manufacturer's instructions.
B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
C. Provide equipment and personnel to handle products; use methods to prevent damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.
B. Store products with seals and labels intact and legible.
C. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.
D. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
E. Provide equipment and personnel to store products; use methods to prevent damage.

F. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION
SECTION 01700

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Field engineering.
B. Closeout procedures.
C. Project record documents.
D. Product warranties and product bonds.
E. Examination.
F. Execution.
G. Protecting installed construction.
H. Final cleaning.

1.2 FIELD ENGINEERING

A. Employ land surveyor registered at Project location in State of Maine and acceptable to Engineer.
B. Locate and protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
C. Control datum for survey is indicated on Drawings.
D. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.
E. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.3 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
2. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.

3. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.

4. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.

5. Perform final cleaning according to this Section.

1.4 PROJECT RECORD DOCUMENTS

A. Record Drawings (As-built) and Shop Drawings: Legibly mark each item to record actual construction as follows:

1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.

2. Provide red line mark-up as-built Drawings including the following
   a. Structure rim and invert elevations.
   b. Location, invert elevations and depth of installed pipe.
   c. Locations of installed concealed elements of the Work.
   d. Identify and locate existing buried or concealed items encountered during Project.
   e. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   f. Horizontal and vertical location of all spillways, walls, berms and other associated design elements.
   g. Field changes of dimension and detail.

B. Details not on original Drawings.

C. Submit marked-up paper copy documents to Engineer before Substantial Completion.

D. Submit PDF electronic files of marked-up documents to Engineer before Substantial Completion.

1.5 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.
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B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

PART 2 EXECUTION

2.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is suitable for new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

2.2 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step-in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.

E. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.

   1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.

F. Adjust operating products and equipment to ensure smooth and unhindered operation.

2.3 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.
B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Prohibit traffic or storage on recently installed paved surfaces

D. Prohibit traffic from landscaped areas.

2.4 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.

B. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

C. Restore any disturbed or damaged privately-owned landscaping, pavement, or curbing.

D. Clean Site, sweep paved areas, rake clean landscaped surfaces.

E. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION
DIVISION 2
SUPPLEMENTAL TECHNICAL SPECIFICATIONS
SECTION 02110

SITE CLEARING AND GRUBBING

PART 1 GENERAL

1.6 SECTION INCLUDES

A. Definitions.
B. Regulatory requirements.
C. Preparation.
D. Protection.
E. Clearing.
F. Grubbing.
G. Topsoil removal.
H. Disposal.
I. Restoration.

1.7 RELATED SECTIONS

A. Supplemental Technical Specifications, Section 02226, Common Excavation, Embankments, and Compaction.
B. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.
C. Supplemental Technical Specifications, Section 02900, Landscaping.

1.8 DEFINITIONS

A. Loam:
   1. Friable clay loam surface soil found in a depth of not less than four inches.
   2. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over two inches in diameter, and without weeds, roots and other objectionable material.

1.9 REGULATORY REQUIREMENTS

A. Conform to applicable codes for disposal of debris.
B. Coordinate clearing work with utility companies.

PART 2 PRODUCTS – Not used.
PART 3 EXECUTION

3.1 PREPARATION

A. Verify that existing plant life and features designated to remain are tagged or identified.

3.2 PROTECTION

A. Protect utilities that remain from damage.

B. Protect benchmarks and existing structures from damage or displacement.

C. Protect existing trees and other vegetation indicated or directed by the Engineer to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line.

D. Water trees and other vegetation which are to remain within the limits of the work as required to maintain their health during the course of construction operation.

E. Existing trees, brush, shrubs, gardens and other vegetation:

1. Provide protection for roots over 1-1/2" diameter that are cut during construction operations.

2. Coat cut faces with emulsified asphalt, or other acceptable coating, especially formulated for horticultural use on cut or damaged plant tissues.

3. Temporarily cover all exposed roots with wet burlap to prevent roots from drying out; provide earth cover as soon as possible.

4. Protect trees by properly tying off, supporting, or pre-topping and trimming as required.

5. Protect shrubs and bushes by tying, staking, tarpaulins, net-work, fences or barricades.

6. Protect shallow-rooted plants at ground surface under and in some cases outside the spread of branches by covering, or by fences, or barricades to prevent vehicle access, or by bridging timber mats to avoid overly compacting the root mass.

3.3 CLEARING

A. Prior to start of work consult with Engineer regarding clearing operations and limits of pavement cutting.

B. Clear areas, cut trees, remove stumps, required for access to work areas and execution of Work within contract limit lines and as directed by Engineer.

C. Remove paving, curb, poles, posts, signs, fences, pipes, culverts, timber walls, and structures to facilitate excavation. Preserve poles, posts, signs, fences, stone walls, structures and other features called for to be reset. Reset removed objects immediately upon completion of backfilling unless otherwise directed by Engineer.
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D. When partial pavement removal is required, neatly cut pavement in a straight line with a paving saw or compressed air cutter satisfactorily to Engineer.

E. Remove existing stumps and shrubs within marked areas and as directed by Engineer.

F. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.

G. Tree Wound Paint:
   1. Apply to all cut surfaces of trees to remain and to all surgically repaired areas damaged by construction.
   2. Apply material recommended by the tree wound paint manufacturer for trees which are not readily affected by the standard applications.

3.4 GRUBBING

A. Limits of Grubbing: Coincide with limits of fill removal, staging area, and access road.

B. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

C. Remove all stumps, roots over two inches in diameter, and matted roots within limits of grubbing to depths of organics or maximum depths shown below:
   1. Roads - 18 inches.
   2. Lawn areas - 12 inches.

3.5 TOPSOIL REMOVAL

A. Remove vegetation from areas before stripping.

B. Strip topsoil to whatever depths encountered, avoiding its intermingling with the underlying subsoil or other objectionable material.

C. Prevent topsoil from mixing with underlying subsoil or other objectionable material.

D. Where trees are indicated to be left standing, stop topsoil stripping a sufficient distance from such trees to prevent damage to main root system.

E. Stockpiling:
   1. Arrange for stockpile areas acceptable to Owner or Engineer.
   2. Locate out of natural drainageways.
   3. Construct to freely drain surface water to a height not to exceed eight feet with side slopes of 1.5:1 to 2:1.
   4. Construct shallow trench as base of piles to prevent eroding soil from washing into drainage.
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5. Cover if required to prevent windblown dust.

6. Apply temporary seeding if piles remain for a period greater than ten days.

3.6 DISPOSAL

A. Burning of Materials:

1. Burning will not be permitted.

B. Removal: Remove material, debris, rock and extracted plant life from Site daily as it accumulates and legally dispose of.

C. Dumping: Dispose of material in an approved, off Site, legally operated disposal area.

3.7 RESTORATION

A. Restore improvements damaged by or removed by this work to original condition, as acceptable to Owners or other parties or authorities having jurisdiction including but not limited to; fences, signs, trees, shrubs, vegetation, poles, posts, walls.

B. Repair or replace trees and vegetation damaged by construction operations, in a manner acceptable to Owner.

C. Retain qualified tree surgeon to repair tree damage.

D. Replace trees damaged beyond repair.

END OF SECTION
SECTION 02226

COMMON EXCAVATION, EMBANKMENTS, AND COMPACTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Definitions.
B. Protection.
C. Materials.
D. Accessories.
E. Examination.
F. Preparation.
G. Excavation.
H. Construction of embankment.
I. Dust control.
J. Tolerances.
K. Field quality control.
L. Protection and maintenance.

1.2 RELATED SECTIONS

A. Special Provisions, Section 01300, Administrative Requirements.
B. Special Provisions, Section 01400, Quality Requirements.
C. Special Provisions, Section 01500, Temporary Facilities and Controls.
D. Supplemental Technical Specifications, Section 02110, Site Clearing and Grubbing.
E. Supplemental Technical Specifications, Section 02141, Dewatering and Surface Water Control.
F. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.
G. Supplemental Technical Specifications, Section 02900, Landscaping.

1.3 DEFINITIONS

A. Common Excavation: As described in MDOT Standard Specifications Section 203.01.
1.6 PROTECTION

A. Protect trees, shrubs, lawns, rock outcropping, walls, and other features remaining as portion of final landscaping.

B. Protect benchmarks, existing structures, fences, roads, sidewalks, walls, and paving.

C. Protect above or below grade utilities which are to remain.

D. Repair damage.

E. Underpin adjacent structures which may be damaged by excavation work, including service utilities.

F. Notify Engineer of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.

G. Protect excavation and soil adjacent to and beneath foundations from frost.

H. Grade excavation top perimeter to prevent surface water runoff into excavations.

I. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods required to prevent cave-in or loose soil from falling into excavation.

J. Protection - Maintenance of Existing Flows:
   1. Keep existing sewers and drains in operation.
   2. If existing sewers and drains are disturbed provide for maintenance of such flows until work is completed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Subsoil: Reused, meeting requirements of Paragraph 2.1.B below.

B. Common Borrow: MDOT Standard Specifications Section 703.18; Earth, suitable for embankment construction, free from frozen material, perishable rubbish, peat and other unsuitable material, with sufficient moisture content to provide the required compaction and stable embankment, moisture content shall not exceed four percent above optimum. Determine optimum moisture content in accordance with AASHTO T 180, Method C or D.

C. Aggregate Base: 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 three-inch sieve shall meet the gradation requirements of MDOT Standard Specifications Section 703.06 Type A or B aggregate with the following limits:
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<table>
<thead>
<tr>
<th>Percentage by Weight</th>
<th>Passing Square Mesh Sieves</th>
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<tr>
<td>Sieve Designation</td>
<td>Type A</td>
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<tr>
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<td>Aggregate</td>
</tr>
<tr>
<td>1/4 inch</td>
<td>45 - 70</td>
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<tr>
<td>No. 40</td>
<td>30 - 55</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 20</td>
</tr>
<tr>
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<td>0 - 5.0</td>
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</table>

Type A aggregate for base shall not contain particles of rock which will not pass the two-inch square mesh sieve.

D. Aggregate Subbase: Sand or gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a three-inch sieve shall meet the gradation requirements of MDOT Standard Specifications Section 703.06 Type D aggregate with the following limits:

<table>
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<th>Percentage by Weight</th>
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<tbody>
<tr>
<td>Sieve Designation</td>
<td>Type D</td>
</tr>
<tr>
<td>1/4 inch</td>
<td>Aggregate</td>
</tr>
<tr>
<td>No. 40</td>
<td>25 - 70</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 30</td>
</tr>
</tbody>
</table>

Aggregate for subbase shall not contain particles of rock which will not pass the three-inch square mesh sieve.

2.2 ACCESSORIES

A. Calcium Chloride: ASTM D98 commercial grade except as waived by Engineer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine the areas and conditions under which excavating and filling is to be performed and notify Engineer in writing of conditions detrimental to proper and timely completion of work.

2. Correct unsatisfactory conditions in a manner acceptable to Engineer prior to proceeding with work.

3. Verify stockpiled fill to be reused is approved.
3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Identify known underground utilities. Stake and flag locations.
C. Identify and flag surface and aerial utilities.
D. Notify utility companies to remove and relocate utilities as required.
E. Maintain and protect existing utilities remaining which pass through work area.
F. When necessary, compact subgrade surfaces to density requirements for embankment, aggregate base and aggregate subbase materials.
G. Prepare embankment area in accordance with MDOT Standard Specifications Section 203.09.

3.3 EXCAVATION

A. Excavate materials encountered when establishing required subgrade elevations in accordance with MDOT Standard Specifications Sections 203.04 and 203.05.
B. Remove lumped subsoil, boulders, solid mortared stone masonry, concrete masonry and rock.
C. Remove pipes and structures designated to be removed and refill excavation with material as designated by the Engineer in the field.
D. Conform to elevations, contours, dimensions, line and grade shown on Drawings.
E. When excavation through roots is necessary, perform work by hand and cut roots with a sharp axe. Treat cut end in accordance with the Supplemental Technical Specifications, Section 02110, Site Clearing and Grubbing.
F. Correct unauthorized excavation at no cost to Owner.
G. Do not excavate wet subsoil.
H. Stockpile subsoil to a depth not exceeding eight feet.
I. Stockpile excavated material in area acceptable to the Owner and remove excess subsoil not being reused, from Site.
J. Surplus Material:
   1. Make arrangements to provide suitable disposal areas off-Site.
   2. Deposit and grade material to the satisfaction of the owner of the property on which material is deposited.
   3. Obtain any necessary permits for disposal.
   4. Provide suitable watertight vehicles to haul soft or wet materials over streets or pavements to
prevent deposits on same.

5. Keep crosswalks, streets and pavements clean and free of debris.

6. Clean up materials dropped from vehicles as often as directed by Engineer.

3.4 CONSTRUCTION OF EMBANKMENT

A. Place and compact fill materials in continuous layers not exceeding 12 inches loose depth upon compacted material in accordance with MDOT Standard Specifications Sections 203.10, 203.11, 203.12, and 203.16.

B. Employ a placement method so not to disturb or damage structures and utilities.

C. Compact by sheepsfoot or vibratory type compaction equipment means, acceptable to Engineer, to obtain 92% of optimum density as determined in accordance with AASHTO T 180, Method C or D.

D. Maintain optimum moisture content of embankment materials to attain required compaction density.

E. Conform to elevations, contours, dimensions, line and grade shown on Drawings.

F. Remove surplus backfill materials from site.

G. Leave stockpile areas completely free of excess fill materials.

3.5 DUST CONTROL

A. Upon request of Engineer, implement the following dust control measure:

1. Spread calcium chloride uniformly over designated area.

3.6 TOLERANCES

A. Top Surface of Base and Subbase Course: Plus or minus 3/8 inch.

3.7 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with ANSI/ASTM D1556 and under provisions of the Special Provisions, Section 01400, Quality Requirements.

B. Field density tests will be performed in accordance with AASHTO T 191 or AASHTO T 205 adjusted to include only the material passing a ¾-inch sieve or by an approved method using a calibrated nuclear device.

3.8 PROTECTION AND MAINTENANCE

A. Protect newly graded areas from traffic and erosion and keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded and rutted areas within specified tolerances.
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END OF SECTION
SECTION 02241

DEWATERING AND SURFACE WATER CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Dewatering system.

B. Surface water control system.

C. System operation and maintenance.

D. Water disposal.

1.2 RELATED SECTIONS

A. Supplemental Technical Specifications, Section 02226, Common Excavation, Embankments, and Compaction.

B. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.

C. Supplemental Technical Specifications, Section 02900, Landscaping.

1.3 REFERENCES

A. ASTM International:


1.4 DEFINITIONS

A. Dewatering includes the following:

   1. Lowering of ground water table and intercepting horizontal water seepage to prevent ground water from entering excavations.

   2. Reducing piezometric pressure within strata to prevent failure or heaving of excavations.

   3. Disposing of removed water.

B. Surface Water Control: Removal of surface water within open excavations.

1.5 SYSTEM DESCRIPTION

A. Provide dewatering and surface water control systems to permit Work to be completed on dry and stable subgrade.

   1. Install dewatering sump pits and associated the dewatering system to dewater the Site to the elevations indicated on the Drawings.
1.6 PERFORMANCE REQUIREMENTS

A. Design dewatering systems to:

1. Lower water table within areas of excavation to minimum twelve inches below bottom of excavation to permit Work to be completed on dry and stable subgrade.

2. Relieve hydrostatic pressures in confined water bearing strata below excavation to eliminate risk of uplift or other instability of excavation.

3. Prevent damage to adjacent properties, structures, utilities, and facilities from construction operations.

4. Prevent loss of fines, quick condition, or softening of subgrade.

5. Maintain stability of sides and bottoms of excavations.

6. Retain all sediment on-Site within the limit of work.

7. Prevent sediment discharge and degradation of the resource area(s).

B. Design surface water control systems to:

1. Collect and remove surface water and seepage entering excavation.

2. Prevent damage to adjacent properties, structures, utilities, and facilities from construction operations.


4. Retain all sediment on-Site within the limit of work.

5. Prevent sediment discharge and degradation of the resource area(s).

1.7 SUBMITTALS

A. Special Provisions, Section 01330, Submittal Procedures.

B. Shop Drawings:

1. Indicate dewatering system layout, dewatering pump locations, pipe sizes and capacities, grades, surface water control devices, valves, fractionation tank sizes and locations, and water disposal method and location.

2. Indicate primary power system location and capacity.

3. Include detailed description of dewatering system installation procedures and maintenance of equipment.

4. Include written procedure for monitoring weather forecasts and procedure for Site storm preparation prior to rain events expected to exceed one inch of precipitation in a 24-hour
period.

5. Include description of emergency procedures to follow when problems arise.

C. Product Data: Submit data for each of the following:

1. Dewatering Pumps: Indicate sizes, capacities, priming method, motor characteristics.
2. Pumping equipment for control of surface water within excavation.
3. Fractionation tanks: Indicate sizes, capacities, and anticipated discharge plan.

D. Design Data:

1. Indicate design values, analyses, and calculations to support design.
2. Include description and profile of soil and groundwater conditions.

1.8 CLOSEOUT SUBMITTALS

A. Special Provisions, Section 01700, Execution Requirements.

1.9 QUALITY ASSURANCE

A. Comply with authorities having jurisdiction for the following:

1. Drilling and abandoning of wells used for dewatering systems.
2. Water discharge and disposal from pumping operations.

B. Following requirements under the National Pollutant Discharge Elimination System (NPDES), for storm water discharge from construction sites.

C. Perform Work in accordance with MDOT Standard Specifications.

1.10 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum five years documented experience and responsible for design, operation, and maintenance of dewatering systems.

1. Assume sole responsibility for dewatering and surface water control systems and for loss or damage resulting from partial or complete failure of protective measures and settlement or resultant damage caused by ground water control operations.

B. Design, install, and monitor operation of dewatering under direct supervision of Professional Engineer experienced in design of this Work.

1.11 PRE-INSTALLATION MEETINGS

A. Special Provisions, Section 01300, Administrative Requirements.
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B. Convene minimum one week prior to commencing work of this section.

1.12 SEQUENCING

A. Special Provisions, Section 01100, Summary of Work.
B. Sequence work to obtain required permits before start of dewatering operations.
C. Sequence work to install and test dewatering and surface water control systems minimum three
days before starting excavation.

1.13 COORDINATION

A. Special Provisions, Section 01300, Administrative Requirement.
B. Coordinate work to permit the soil excavation operations to be completed on dry stable substrate.

PART 2 PRODUCTS

1.1 DEWATERING EQUIPMENT

A. Dewatering Pumps: Two, portable centrifugal type, self-priming, diesel engine driven; minimum
rated capacity of 250 gpm at 30 feet total dynamic head.
   1. Furnish pumps with screened suction hose and discharge hoses as required to suit application.
B. Fractionation Tanks: Provide a minimum on two fractionation (frac) tanks. Tank specifications to
be in accordance with the Drawings.

1.2 ACCESSORIES

A. Valves and Fittings: Furnish valves and fittings to isolate each well from header pipe and to
prevent loss of pump prime.
B. Filter Sand: ASTM C33; natural river or bank sand; washed; free of silt, clay, loam, friable or
soluble materials, and organic matter; graded to suit well screen.
C. Grout: Mixture of Portland cement and bentonite clay or sand suitable for sealing abandoned wells
and piping.
D. Hoses: Minimum of three-inch diameter; length to suit.

PART 3 EXECUTION

1.1 EXAMINATION

A. Special Provisions, Section 01300, Administrative Requirements.
B. Conduct initial soil investigations to complete the dewatering system design.
Call Local Utility Line Information service not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

Conduct dewatering operations in accordance with all Local, State, and Federal permit requirements.

1.2 PREPARATION

A. Protect existing adjacent buildings, structures, and improvements from damage caused by dewatering operations.

1.3 DEWATERING SYSTEM

A. Install dewatering system in accordance with Drawings.

B. Locate system components to allow continuous dewatering operations without interfering with installation of permanent Work and existing public rights-of-way, sidewalks, and adjacent buildings, structures, and improvements.

C. Excavate sump pits in locations and to the size/depth indicated on the Drawings. Provide temporary surface casing when required to stabilize soil.

1.4 SURFACE WATER CONTROL SYSTEM

A. Provide ditches, berms, and other devices to divert and drain surface water from excavation area.

B. Divert surface water and seepage water within excavation areas into sumps and pump water into fractionation tanks in accordance with the Drawings.

C. Control and remove unanticipated water seepage into excavation.

1.5 SYSTEM OPERATION AND MAINTENANCE

A. Operate dewatering system continuously until the gravel wetland stone backfilling operation is complete.

B. Provide 24-hour supervision of dewatering system by personnel skilled in operation, maintenance, and replacement of system components.

C. Conduct daily observation of dewatering system. Make required repairs and perform scheduled maintenance.

D. Fill fuel tanks before tanks reach 25 percent capacity.

E. Start emergency generators at least twice each week to check operating condition.
F. When dewatering system cannot control water within excavation, notify the Engineer and stop excavation work.

1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.

2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.

G. Modify dewatering and surface water control systems when operation causes or threatens to cause damage to new construction, existing Site improvements, or adjacent property.

H. Correct unanticipated pressure conditions affecting dewatering system performance.

I. Do not discontinue dewatering operations without Engineer’s approval.

1.6 WATER DISPOSAL

A. Discharge water into sediment removal device prior to discharge at the existing drainage channel(s) indicated on the Drawings.

1.7 SYSTEM REMOVAL

A. Remove dewatering and surface water control systems after dewatering operations are discontinued.

B. Remove all drainage pipe associated with the dewatering sump pits.

C. Repair damage caused by dewatering and surface water control systems or resulting from failure of systems to protect property.

1.8 FIELD QUALITY CONTROL

A. After dewatering system is installed, perform pumping test to determine when selected pumping rate lowers water level in sump pit below pump intake. Adjust pump speed, discharge volume, or both to ensure proper operation of each pump.

1. At no time will the fractionation tanks be allowed to overtop. Adjust pumping rates as necessary.

B. Monitor and record the individual pumping rates and/or pump settings until steady state conditions occur. Then monitor and record conditions three times each week.

END OF SECTION
SECTION 02270

SLOPE PROTECTION AND EROSION CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. References.

B. Descriptions.

C. Submittals.

D. Regulatory Requirements.

E. Environmental Requirements.

F. Materials.

G. Examination.

H. Installation.

I. Maintenance.

J. Field Quality Control.

K. Temporary Erosion Control Removal.

1.2 RELATED SECTIONS

A. Supplementary Conditions: Article 19 - Environmental Requirements.

B. Special Provisions, Section 01330, Submittal Procedures.

C. Special Provisions, Section 01500, Temporary Facilities and Controls.

D. Supplemental Technical Specifications, Section 02110, Site Clearing and Grubbing.

E. Supplemental Technical Specifications, Section 02226, Common Excavation, Embankments, and Compaction.

F. Supplemental Technical Specifications, Section 02900, Landscaping.

1.3 REFERENCES

A. MDOT Standard Specification Section 610.032(b) - Placing Stones.

B. MDOT Standard Specifications Section 613.05 - Installation, Erosion Control Blankets.
C. MDOT Standard Specifications Section 717.061 - Erosion Control Blankets.

D. MDOT Standard Specifications Section 717.063 - Ground Anchors.

1.4 DESCRIPITONS

A. Temporary Seeding: Consists of application of fertilizer and seed to slopes and other area to prevent or control erosion of soil during construction and prior to completion of permanent erosion control and landscape requirements. If permanent seed will not be applied within 10 days of final grading, apply temporary seed.

1.5 SUBMITTALS

A. Submit product data under the Special Provisions, Section 01330, Submittal Procedures.

B. Submit samples of geotextile fabric and erosion control matting under the Special Provisions, Section 01330, Submittal Procedures.

C. Submit one sample 8-1/2 x 11 inches of each type of geotextile/matting taken from a representative roll and furnished with most recent manufacturer's product data sheet to Engineer for his approval before installation; product data sheet shall include test methods and geotextile properties specified. If geotextile property values expressed in "minimum values" or "minimum average roll values" for any lot are less than minimum permissible values in specification, then entire lot shall be rejected. These "minimum average roll values" imply that average test results from any roll within a lot or shipment meet or exceed minimum permissible values required in specification.

D. If "minimum values" or "minimum average roll values" are not available from manufacturer, then "average values" or "typical property values" for mechanical properties only shall be reduced by 20 percent and then compared to minimum permissible values in specifications for determination of acceptance.

1.6 REGULATORY REQUIREMENTS

A. Conform to U.S. Environmental Protection Agency publication 430/9-73-007 "Process, Procedures and Methods to Control Pollution Resulting From All Construction Activity."


C. Maintain one copy of each document on Site.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain erosion control installations during the life of the Contract, repair damage.

B. Do not seed when wind velocity exceeds 30 mph.

C. Sow temporary seed within the following dates unless approved by Engineer:

1. Annual Ryegrass - April 1 to July 1 and August 15 to September 15.
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2. Sudangrass - May 15 to August 15.
3. Winter Ryegrass - August 15 to October 15.
4. Wetland Seed Mix - All Year (See Appendix C, Replanting Plan)

PART 2 PRODUCTS

2.3 MATERIALS

A. Erosion Control Mix Berm:
   1. Coarse stump grindings with fines and organic components present.

B. Hay Bales: Baled hay approximately 14 by 18 by 30 inches securely tied to form a firm bale.

C. Temporary Seed: MDOT Standard Specifications Section 618.02.

D. Erosion Control Blanket: Biodegradable, double net straw mat.


F. Geotextile Fabric: Pyramax 25 or approved equal by ACF Environmental.

G. Silt bags, silt sacks, dandy bags or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surface conditions.

3.2 INSTALLATION

A. Install sediment barrier before soil disturbances.

B. Install sediment barrier (erosion control mix berm) in accordance with Drawing Detail.

C. Install hay bales in accordance with MDOT Standard Specifications Section 656.

D. Apply temporary seed and fertilizer in accordance with MDOT Standard Specifications Sections 618.03 through 618.07 at the following rates:

   Annual Ryegrass - 0.9 lbs per 1,000 square feet.
   Sudangrass - 0.9 lbs per 1,000 square feet.
   Winter Ryegrass - 2.6 lbs per 1,000 square feet.
   Wetland Seed – 1.0 lbs per 1,000 square feet.

E. Install erosion control blanket in accordance with MDOT Standard Specifications Section 613.
Install plain and hand laid riprap in accordance with MDOT Standard Specifications Section 610.032(b).

Install geotextile fabric beneath riprap construction:

1. Placement:
   a. Prior to placement of fabric, prepare Site to provide a smooth surface which is free from obstructions and depressions which could result in fabric being torn or punctured during cover operation.
   b. Unroll fabric loosely and position as smoothly as possible on surface to minimize wrinkles and folds.
   c. Place fabric on slopes with long direction oriented up and down slope.
   d. Overlap joints between adjacent fabric roll ends that may occur on slope shingle style.
   e. When fabric is to be placed in a ditch, channel, downspout to other area where water will flow, place fabric with long direction parallel to direction of water flow, place adjacent lengths of fabric so that upstream roll edge overlaps downstream roll edge.

H. When riprap is placed on fabric, place stones so that they do not puncture or otherwise damage fabric. Fabric to be placed under heavy riprap, or where the stone weights in plain riprap are greater than 250 pounds, shall be non-woven Class A Erosion Control Geotextile with a six-inch thick protective aggregate cushion placed on top of the fabric to protect the fabric from damage. The aggregate cushion may be omitted if it can be demonstrated to the Engineer that no damage will occur to the fabric by the placement of the stone.

1. The height of drop of riprap stones less than 250 pounds shall be no greater than three feet with a six-inch thick protective aggregate cushion is utilized nor no greater than one foot if stones are placed directly on the fabric.

2. Riprap stones greater than 250 pounds shall be placed with no free-fall or field trials shall be performed, to the satisfaction of the Engineer, to determine the maximum height of drop that will not damage the fabric. In no case shall the maximum drop be greater than three feet.

3. At no time shall riprap stones greater than 100 pounds be rolled down the slope where fabric has been placed.

4. In all cases, the six-inch thick protective aggregate cushion shall be in addition to specified riprap thickness, meeting requirements for granular borrow for underwater backfill, MDOT Standard Specifications Section 703.19.

5. Place riprap so fabric is completely covered and anchored against underlying slope.

I. When toe of riprap will be subjected to erosion by current of wave action, lap bottom edge of fabric back into riprap for a minimum of three feet and secure with riprap.

1. Overlap: Join adjacent lengths of fabric by overlapping a minimum of 18 inches at ends and sides except when sewing is specified or fabric is placed on slopes. Place overlaps on slopes...
as follows:

a. For Slopes at 3 Horizontal to 1 Vertical or Steeper: Sewn seams or minimum three-foot overlaps with no pinning or staking allowed.

b. For Slopes Flatter than 3 Horizontal to 1 Vertical: Sewn seams or minimum 18 inches overlaps and pins or stakes may be used to anchor the overlaps at the recommended spacings.

2. Protection of Fabric:


b. Prior to installation, protect fabric from rain, from sunlight or other ultra-violet exposure and from dust, mud, debris or other elements that may affect its performance.

c. Do not place fabric which is torn, punctured or otherwise damaged.

d. During installation, do not leave fabric exposed for more than five days without being covered.

J. Damaged Fabric:

1. Replace fabric which is damaged after placement or repair by placing a piece of same type of fabric over damaged area with at least an 18-inch overlap in all directions.

2. When sewn seams are used, Engineer may require damaged fabric be stitched together or damage repaired by sewing a patch of fabric over damaged areas.

K. Sampling and Acceptance: An 8-1/2 by 11inch sample of each type of geotextile fabric shall be taken from a representative roll and furnished with the most recent manufacturer's product data sheet to the Engineer for his approval before installation. The product data sheet shall include the test methods and the geotextile properties specified. If the geotextile property values express in "minimum values" or "minimum average roll values" for any lot are less than the minimum permissible values in the specification, then the entire lot shall be rejected. These "minimum average roll values" imply that the average test results from any roll within a lot or shipment meet or exceed the minimum permissible values required in the specification.

L. If the "minimum values" or the "minimum average roll values" are not available from the manufacturer, then the "average values" or "typical property values" for the mechanical properties only shall be reduced by 20 percent and then compared to the minimum permissible values in the specifications for determination of acceptance.


N. Use Dandy bags or dirt bags to prevent silt runoff from dewatering operations.

3.3 MAINTENANCE
A. Maintain erosion control measures in a functional condition at all times. Inspect after each rainfall and at least daily during prolonged rainfall. Immediately correct deficiencies.

B. Make a daily review of the location of erosion control measures in areas where construction activity causes drainage runoff to ensure that erosion control measures are properly located for effectiveness.

C. Where deficiencies exist, install additional erosion control measures as needed.

3.4 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of the Special Provisions, Section 01400, Quality Requirements.

3.5 TEMPORARY EROSION CONTROL REMOVAL

A. Remove sediment deposits and dispose off Site unless agreed otherwise by Engineer.

B. If allowed by Engineer, grade sediment deposits remaining in place after devices are no longer required and grade to conform with existing ground, seed and mulch immediately.

C. Replace filter cloth which has decomposed or becomes ineffective and is still needed with material equal to original design.

D. Spread out temporary sediment barrier and hay bales when no longer needed and dispose of in a proper manner.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. The work under this item must conform to the relevant provisions of Sections 620, and any other relevant sections of the State of Maine DOT “Standard Specifications,” except as amended and supplemented and as indicated on the Drawings and as specified herein. Complete work in accordance with the Specifications and in conformity with the lines and grades indicated on the Drawings.

B. This work consists of furnishing all labor, equipment, and materials and performing all work associated with the installation of the ACF270HP, or equivalent, under the riprap downspout proposed to repair embankment failure #2. Work is to occur at the locations indicated on the Drawings and at locations identified in the field by the Engineer.

C. This work consists of furnishing all labor, equipment, and materials and performing all work associated with the installation of the liner.

D. Related Sections:


2. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.

1.2 REFERENCES

A. ASTM International:

1. ASTM D 792 - Specific gravity (relative density) and density of plastics by displacement.

2. ASTM D 1004 - Initial tear resistance of plastic sheeting.

3. ASTM D 1238 - Flow rates of thermoplastics by extrusion plastometers.

4. ASTM D 1505 - Density of plastics by the Density-Gradient technique.

5. ASTM D 1603 - Carbon black in olefin plastics.

6. ASTM D 1898 - Sampling of plastics.

7. ASTM D 3895 - Test method for oxidative induction time of polyolefins by thermal analysis.

8. ASTM D 4833 - Index Puncture Resistance of geotextiles, geomembranes and
related products.


10. ASTM D 5885 - Test method for oxidative induction time of polyolefin geosynthetics by high pressure differential scanning calorimetry.

11. ASTM D 6392 - Determining the integrity of nonreinforced geomembrane seams produced using thermo-fusing methods.

B. Geosynthetic Research Institute (GRI):


2. GRI GM 11 - Accelerated weathering of geomembranes using a fluorescent UVA-condensation exposure device.

1.3 COORDINATION

A. Coordinate work with the installation of the riprap downspout.

1.4 SUBMITTALS

A. Special Provisions, Section 01330, Submittal Procedures.

B. Geotextile Product Data

1. Submit product data on the following:

   a. Woven geotextile liner.

C. Samples:

1. Geotextile liner: A 4” x 4” geotextile product sample.

D. Manufacturer’s Certificate: Certify products meet or exceed specified requirements.

E. Material Suppliers: Name, address, and phone number.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle, and store materials in accordance with supplier's instructions.

B. Geotextile On-Site Storage:

1. Store geotextile to protect from puncture, dirt, grease, moisture, and excessive heat.

2. Store damaged material separately for repair or replacement.

3. Store the rolls on a prepared smooth surface (not wooden pallets) and do not stack more than two rolls high.
PART 2 PRODUCTS

2.1 GEOTEXTILE LINER

A. Liner with a minimum tensile strength of 2340 x 2412 lbs/ft.
   1. The surface of the geotextile must be free from pinholes or bubbles.

PART 3 EXECUTION

3.1 GEOTEXTILE INSTALLATION

A. Coordinate work with the installation of riprap downspout, as indicated on the Drawings.

B. Prepare the subgrade prior to installation. The Engineer must approve the subgrade preparation prior to liner installation. All surfaces must be smooth, free of all foreign and organic material, sharp objects, or debris of any kind. The subgrade must provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Standing water or excessive moisture prior to liner installation is not allowed.

C. Place and install liner at locations indicated on Drawings or as directed by the Engineer. Deploy rolls using a spreader bar assembly attached to a loader bucket or by other methods approved by the Manufacturer.

D. The liner must be placed in one continuous placement with no seams.

E. Anchor liner as indicated on Drawings.

F. Carefully backfill around liner in soil/stone lifts to prevent liner movement. Prevent liner damage. Repair damaged liner areas prior to backfilling at no additional cost to the owner.

3.2 PROTECTION OF WORK

A. Equipment or tools must not damage the geomembrane liner during handling, transportation and deployment.

B. Personnel working on the geomembrane liner must not smoke or wear damaging shoes.

C. The method used to unroll the liner must not cause scratches or crimps in the geomembrane and must not damage the supporting soil.

D. Place adequate loading (e.g., sand bags or similar items that will not damage the geomembrane) to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).

E. Do not operate construction equipment or machinery directly on the liner.

3.3 ACCEPTANCE
A. Final acceptance is when liner installation is complete and the work has been verified for adequacy by the Engineer.

END OF SECTION
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SECTION 02900  

LANDSCAPING  

PART 1 GENERAL  

1.1 SECTION INCLUDES  

A. References.  
B. Definitions.  
C. Submittals.  
D. Operation and maintenance data.  
E. Quality assurance.  
F. Regulatory requirements.  
G. Delivery, storage, and handling.  
H. Environmental requirements.  
I. Sequencing and scheduling.  
J. Warranty.  
K. Maintenance service – plantings.  
L. Seed mixtures.  
M. Trees and plants.  
N. Soil materials.  
O. Soil amendment materials.  
P. Mulch materials.  
Q. Accessories.  
R. Source Quality Control.  
S. Tests.  
T. Verification.  
U. Examination.  
V. Preparation of subsoil.  
W. Placing topsoil.
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X. Tolerances.
Y. Fertilizing.
Z. Seeding.
AA. Hydroseeding.
BB. Seed protection.
CC. Maintenance plantings.
DD. Installation of accessories.
EE. Plant support.
FF. Field quality control.

1.2 RELATED SECTIONS
A. Supplemental Technical Specifications, Section 02226, Common Excavation, Embankments, and Compaction.
B. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.
C. Supplemental Technical Specifications, Section 02924, Seeding.
D. Supplemental Technical Specifications, Section 02930, Plantings
E. Supplemental Technical Specifications, Section 02931, Planting Soil.

1.3 REFERENCES
A. ANSI Z60.1 - Nursery Stock.
B. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.4 DEFINITIONS
B. Plants: Living trees and plants.

1.5 SUBMITTALS
A. Submit manufacturer's instructions for fertilizer mixing and application rates under provisions of the Special Provisions, Section 01330, Submittal Procedures.

1.6 OPERATION AND MAINTENANCE DATA

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A. Submit instructions for continuing Owner maintenance under provisions of the Special Provisions, Section 01700, Execution and Closeout Requirements.

B. Include maintenance instructions, cutting and trimming methods, maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.7 QUALITY ASSURANCE

A. Nursery: Company specializing in growing and cultivating the plants specified in this Section with minimum three years’ experience.

B. Installer: Company specializing in installing and planting the plants specified in this Section with minimum three years’ experience.

C. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging and location of packaging.

1.8 REGULATORY REQUIREMENTS

A. Comply with regulatory requirements for fertilizer and herbicide composition.

B. Plant Materials: Certified by state department of agriculture; described by ANSI Z60.1; free of disease or hazardous insects.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Site under provisions of the Special Provisions, Section 01600, Product Requirements.

B. Store and protect products under provisions of the Special Provisions, Section 01600, Product Requirements.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

D. Protect plants until planted.

E. Deliver plant life materials immediately prior to placement. Keep plants moist.

F. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not install plant life when ambient temperatures may drop below 35 degrees F (2 degrees C) or above 90 degrees F (32 degrees C).

B. Do not install plants or seed lawns when wind velocity exceeds 30 mph.

C. Install plantings and sow seed within the following dates unless approved by Engineer:

1.11 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with fill and invasives removal.

1.12 WARRANTY

A. Provide a warranty on work of this Section for a minimum one year including one continuous growing season. Commence warranty on date identified in the Certificate of Substantial Completion.

B. Warranty: Include coverage of plants from death or unhealthy conditions.

C. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

1.13 MAINTENANCE SERVICE - PLANTINGS

A. Maintenance Services: Performed by installer.

B. Maintain plant life immediately after placement until plants are well established and exhibit a vigorous growing condition. Continue maintenance until three months after substantial completion.

C. Maintenance to include:

1. Cultivation and weeding plant beds and tree pits.

2. Application of herbicides for weed control in accordance with manufacturer's instructions. Remedy damage resulting from use of herbicides.

3. Application of pesticides in accordance with manufacturer's instructions. Remedy damage from use of pesticides.

4. Irrigating sufficient to saturate root system.

5. Trimming and pruning, including removal of clippings and dead or broken branches, and treatment of pruned areas or other wounds.

6. Disease control.

7. Maintaining wrapping, guys, and stakes. Repair or replace accessories when required.

PART 2 PRODUCTS

2.1 SEED MIXTURES

A. Seed Mixtures:

1. Park Mixture

   50% Creeping Red Fescue
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30% Kentucky Blue Rye  
20% Annual Rye  
Mixture used where lawn will be maintained.

2. Wetland Mixture

See Appendix C for Wetland Seed Mix.  
Mixture used within floodplain delineation shown on Drawings.

3. Conservation Mixture

40% Creeping Red Fescue  
25% Kentucky Blue  
25% Kentucky 31 Fescue  
10% White Clover or Annual Rye  
Mixture used when maintenance will be infrequent.

2.2 TREES AND PLANTS

A. Trees and Plants: Species and size identifiable on the plans, grown in climatic conditions similar to those in locality of the Work.

2.3 SOIL MATERIALS

A. Topsoil: Either stripped from Site or imported, friable loam; free of subsoil, large clods, lumps, roots, grass, excessive amount of weeds, stone, and foreign matter 2" or greater and smaller stones in excessive quantities as determined by the Engineer; acidity range (pH) of 5.5 to 7.5; containing a minimum of four percent and a maximum of 25 percent organic matter.

2.4 SOIL AMENDMENT MATERIALS

A. Controlled Release Fertilizer: Plant food in tablet or packet form guaranteed to release fertilizer for five years or more; for use in all tree and shrub plantings.

B. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight; 4 to 5 pH range; moisture content of 30 percent.

C. Bone Meal: Agricultural limestone per Cumberland County Soil & Water Conservation Service.

D. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

E. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass and plants.

F. Soil Polymer: Water absorbing synthetic material. Apply according to manufacturer's direction.

2.5 MULCH MATERIALS

A. Mulching Material for Planting Beds: Ground bark, free of growth or germination inhibiting
ingredients.

B. Mulching Material for Seeded Areas: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

2.6 ACCESSORIES

A. Wrapping Materials: Burlap and trunk wrap.

B. Stakes: Hardwood lumber, pointed end.

C. Plastic Guying Chain, Galvanized Cable, Wire, or Web Strapping and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resultant movement of plant life.

D. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.

E. Landscape fabric synthetic matting, porous to water.

F. Erosion Fabric: Jute matting, open weave.

G. String: Inorganic fiber.

2.7 SOURCE QUALITY CONTROL

A. Provide inspection and testing for verifying acceptability of plants.

2.8 TESTS

A. Provide analysis of imported and existing topsoil.

B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter, and pH value.

C. Submit minimum 10 lb sample of topsoil proposed. Forward sample to testing laboratory in sealed containers to prevent contamination. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

2.9 VERIFICATION

A. Provide certification of inspection by authority having jurisdiction for confirming approval of plants supplied.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared subsoil and planting beds are ready to receive work of this Section.

B. Saturate soil with water to test drainage.
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C. Beginning of installation means acceptance of existing conditions.  

3.2 PREPARATION OF SUBSOIL  

A. Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.  

B. Remove foreign materials, weeds, and undesirable plants and their roots. Remove contaminated subsoil.  

C. Scarify subsoil to a depth of four inches where topsoil and plants are to be placed. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subsoil.  

D. Dig pits and beds 12 inches larger than plant root system or to dimensions shown on Drawings.  

3.3 PLACING TOPSOIL  

A. Unless otherwise noted on plans, spread topsoil to a minimum depth of four inches over area to be seeded and planted. Rake smooth.  

B. Place topsoil during dry weather and on dry unfrozen subgrade.  

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.  

D. Grade topsoil to eliminate rough, low, or soft areas, and to ensure positive drainage. Maintain levels, profiles and contours of subgrade.  

E. Manually spread topsoil around trees, plants, buildings and other appurtenances to prevent damage.  

F. Remove surplus topsoil from Site.  

G. Leave stockpile area and Site clean, raked, ready for seeding.  

H. Install topsoil mixture in pits and beds intended for plant root balls, to a minimum thickness as indicated on Drawings.  

3.4 TOLERANCES  

A. Top of Topsoil: Plus or minus 1/10 foot.  

3.5 FERTILIZING  

A. Apply fertilizer in accordance with manufacturer's instructions.  

B. Apply after smooth raking of topsoil.  

C. Mix thoroughly into upper two inches of topsoil.  

D. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
E. Lightly water to aid the dissipation of fertilizer.

3.6 SEEDING

A. Seed disturbed areas not designated for any other treatment.

B. Apply seed (at a rate of 3 lbs. per 1000 sq. ft.) or in accordance with manufacturer's instructions evenly in two intersecting directions. Rake in lightly. Do not seed area in excess of that which can be mulched on same day.

C. Planting Season: Per Paragraph 1.10 of this Section.

D. Do not sow immediately following rain, when ground is too dry, or during windy periods.

E. Immediately following seeding, apply straw mulch at a rate of one to two tons per acre. Maintain clear of shrubs and trees.

F. Apply water with a fine spray immediately after each area has been mulched. Saturate to four inches of soil.

3.7 HYDROSEEDING

A. Apply seeded slurry at a rate of 25 lbs lime, 30 lbs 10-10-10 fertilizer, 3 lbs seed and 5 lbs birdsfoot trefoil per 1,000 sq. ft. evenly in two intersecting directions, with a hydraulic seeder in accordance with MDOT Standard Specifications Section 618.07. Do not hydroseed area in excess of that which can be mulched on same day.

B. Immediately following seeding, apply straw mulch at a rate of one to two tons per acre. Maintain clear of shrubs and trees.

C. Apply water with a fine spray immediately after each area has been mulched. Saturate to four inches of soil.

3.8 SEED PROTECTION

A. Cover seeded slopes with erosion fabric where grade is greater than four inches per foot. Roll fabric onto slopes without stretching or pulling.

B. Lay fabric smoothly on surface, bury top end of each section in six-inch deep excavated topsoil trench. Provide 12-inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.

C. Secure with staples in accordance with manufacturer's recommendations.

D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges a minimum six inches.

3.9 MAINTENANCE PLANTINGS
A. Place plants for best appearance for review and final orientation by Engineer.

B. Set plants vertical.

C. Remove all non-biodegradable root containers including but not limited to plastic pots, wire cages, nylon string.

D. Take care to examine roots of plants grown in plastic containers. If growing in a circular fashion, spread roots before backfilling.

E. Set plants in pits or beds, partly filled with prepared topsoil mixture. Loosen top 1/3 of burlap and all burlap, ropes, and wires from the root ball or as indicated on drawings.

F. Place slow release fertilizer packets in planting pit according to manufacturer's instructions and plant types around all woody plants at time of planting. Place packets even around planting pit, adjacent to, but not in contact with root mass. Place at six to eight inches depth. Do not cut, rip or open packets.


H. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

I. Liquid Feeding: Liquid feeding shall occur after the backfilling of woody plants. Mix a balanced liquid fertilizer in accordance with manufacturer's instructions. Apply mixture at the following rates:

   - Plants up to 2 feet height: 4 quarts
   - Plants 2 feet to 6 feet: 6 quarts
   - Plants 6 feet to 12 feet: 12 quarts
   - Plants above 12 feet: 16 quarts

3.10 INSTALLATION OF ACCESSORIES

A. Place bark mulch, where indicated on Drawings and Details.

3.11 PLANT SUPPORT

A. Brace plants vertically with plant protector wrapped guy wires and stakes to the following:

<table>
<thead>
<tr>
<th>Tree Caliper</th>
<th>Tree Support Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>1 stake with one tie</td>
</tr>
<tr>
<td>1 - 2 inches</td>
<td>2 stakes with two ties</td>
</tr>
<tr>
<td>2 - 4 inches</td>
<td>3 guy wires with eye bolts and turnbuckles</td>
</tr>
<tr>
<td>Over 4 inches</td>
<td>4 guy wires with eye bolts and turnbuckles</td>
</tr>
</tbody>
</table>
FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of the Special Provisions, Section 01400, Quality Requirements.

B. Plants will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

END OF SECTION
SECTION 02924
SEEDING

PART 1 GENERAL

1.1 SECTIONS INCLUDE

A. Seeding.
B. Hydoseeding.
C. Mulching.
D. Maintenance.

1.2 RELATED SECTIONS:

A. Supplemental Technical Specifications, Section 02226, Common Excavation, Embankments, and Compaction.
B. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.
C. Supplemental Technical Specifications, Section 02900, Landscaping.
D. Supplemental Technical Specifications, Section 02930, Plantings
E. Supplemental Technical Specifications, Section 02931, Planting Soil.

1.3 REFERENCES

A. ASTM International:

1.4 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

1.5 SUBMITTALS

A. Special Provisions, Section 01330, Submittal Procedures.
B. Installer: Include lists of completed projects, with project names, addresses, phone numbers, and names and address of designers and clients.
C. Seed Mix: Product Data and Manufacturer's Certificate of Compliance with the specifications for each type of seed to include the No seed may be sown until the Contractor has submitted the certificates.
D. Product Data: Submit data for the following:
LONG CREEK – MAIN STEM RESTORATION PROJECT
LONG CREEK WATERSHED MANAGEMENT DISTRICT
SOUTH PORTLAND, MAINE

1. Seed mixes.
2. Fertilizer.
3. Mulch.
4. Lawn herbicides and pesticides.
5. Other accessories.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements for the following:
   1. Seed mixes:
      a. Guaranteed percentage of purity, weed content and germination of the seed, and the net weight and date of shipment and pounds per acre sowing rate.

F. Maintenance Schedule: Provide watering schedule to the Owner and/or Engineer for approval.

1.6 CLOSEOUT SUBMITTALS

A. Special Provisions, Section 01700, Execution and Closeout Requirements.

B. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.7 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

B. If required, only use herbicides, pre-emergents, fertilizers, fungicides, and pesticides reviewed and approved by the Engineer. Application to be performed by a licensed professional according to manufacturer's recommendations.

C. Select compatible products where options are provided.

D. Perform Work in accordance with State of Maine Department of Transportation standards unless noted otherwise in this specification.

1.8 QUALIFICATIONS

A. Seed Supplier: Company specializing in manufacturing Products specified in this section.

B. Installer: Company specializing in performing work of this section with a minimum five-years’ experience and with a record of successful grass establishment.
LONG CREEK – MAIN STEM RESTORATION PROJECT
LONG CREEK WATERSHED MANAGEMENT DISTRICT
SOUTH PORTLAND, MAINE

1. Installer to provide an experienced supervisor on the Project Site during all times that landscape construction is in progress. Provide written qualification data for firms and persons to be responsible for Work, to demonstrate their capabilities and experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Special Provisions, Section 01600, Product Requirements.

B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.10 MAINTENANCE SERVICE

A. Special Provisions, Section 01700, Execution Requirements.

B. Maintenance includes the inspection, watering, weeding, fertilizing, mowing, repairing and/or reseeding of all seeded areas.

C. Maintain seeded areas for one year from Date of Substantial Completion.

D. Extend the maintenance period for all seeded areas until satisfactory grass growth is established.

E. In the event that seeding operations are completed too late in the Fall for adequate germination, continue maintenance into the following Spring and Fall and reseed as necessary for satisfactory seeded grass establishment.

1.11 GUARANTEE

A. Satisfactory Seeded Grass: A healthy, uniform close stand of grass free of surface irregularities with coverage exceeding 90 percent over any 10 sq. ft. scattered bare spots, none of which are larger than 72 square inches, will be allowed up to a maximum of 2% of any lawn area.

B. Upon completion of the minimum maintenance period, request, in writing, an inspection by the Owner to determine whether satisfactory seed growth has been established. If the seeded areas and workmanship are determined to be satisfactory as defined in the specifications, written notice will be given by the Engineer to the Contractor and Owner.

C. If the grass is determined to be unsatisfactory as defined in the specifications at the time of inspection, repair and/or reseed areas determined to be unacceptable.

1.12 ENVIRONMENTAL REQUIREMENTS

A. Planting Restrictions: Plant during one of the following periods:

B. Seeding before or after the above referenced planting dates will increase the likelihood of grass seed establishment failure. Any deviation from the above referenced planting dates is undertaken at sole risk of the contractor and it is the responsibility of the contractor to provide any additional maintenance and watering which may be required to ensure satisfactory plant and seed establishment.

C. Seeding outside of season to occur only with permission of the Engineer, and may result in reseeding the following season until satisfactory seed establishment is provided. Acceptance will not be given to areas seeded outside of season until satisfactory grass has been established. Out-of-season seeding during hot weather will require additional watering and shade mulching with netted hay-type erosion control fabric.

D. Seeding under frozen conditions in either the spring or fall will not be permitted.

PART 2 PRODUCTS

2.1 SEED MIXTURE

A. Grass Seed to be of the previous year’s crop and the weed seed content is not to exceed 1% by mass.

B. Use only low maintenance seed mixes appropriate for cut and fill slopes, detention basins, and disturbed areas as listed below.

C. Suppliers:

1. New England Wetland Plants; or

2. Approved equivalent.

D. Seed Mixture:

1. New England Wet Mix

<table>
<thead>
<tr>
<th>Grasses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carex Lured</td>
<td></td>
</tr>
<tr>
<td>Carex scoparia</td>
<td></td>
</tr>
<tr>
<td>Carex lupulina</td>
<td></td>
</tr>
<tr>
<td>Panicum rigidulum</td>
<td></td>
</tr>
<tr>
<td>Elymus virginicus</td>
<td></td>
</tr>
<tr>
<td>Deschampsia cespitosa</td>
<td></td>
</tr>
<tr>
<td>Eleocharis palustris</td>
<td></td>
</tr>
<tr>
<td>Juncus effusus</td>
<td></td>
</tr>
<tr>
<td>Carex crinita</td>
<td></td>
</tr>
<tr>
<td>Glyceria Canadensis</td>
<td></td>
</tr>
</tbody>
</table>

Application rate of 18 lbs/Acre

2. New England Erosion Control/ Restoration Mix for Moist Sites
Grasses

<table>
<thead>
<tr>
<th>Elymus virginicus</th>
<th>Schizachyrium scoparium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Festuca rubra</td>
<td>Andropogon gerardii</td>
</tr>
<tr>
<td>Carex vulpinoidea</td>
<td>Panicum virgatum</td>
</tr>
<tr>
<td>Agrostis scabra</td>
<td></td>
</tr>
</tbody>
</table>

Application rate of 35 lbs/Acre

3. The seed mixes to be a low maintenance seeding, and appropriate for cut and fill slopes and disturbed areas adjacent to environmental resource areas.

2.2 SOIL AMENDMENTS

A. Lime: Ground limestone, dolomite type, containing a minimum 89 percent calcium carbonate equivalent.

1. Its value is based on chemical composition (calcium carbonate equivalent) and degree of fineness. Ground agricultural limestone is available as calcium carbonate (calcite) or as a mixture of calcium and magnesium carbonate (dolomite). Standard ground agricultural limestone contains a minimum of 89 percent calcium carbonate equivalent calcium carbonate plus (magnesium carbonate × 1.19).

2. 95 percent passing a 20 mesh sieve, 60 percent passing a 60 mesh sieve, and 50 percent passing a 100 mesh sieve.

B. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass. Includes hose and all other watering equipment required for the Work.

C. Erosion Control Geotextile/Fabric: Erosion control matting, open weave.

2.3 ACCESSORIES

A. Wood-Cellulose Mulch (Hydromulch): Specially prepared green-dyed and air-dried wood-cellulose fibers, containing no growth or germination inhibiting substances, in packages not exceeding 100 pounds gross, with net weight shown on the package, and meeting the following requirements:

1. Fiber processed from whole wood chips manufactured specifically for standard hydraulic mulching equipment. Not produced from recycled material such as sawdust, paper, or cardboard.

2. Moisture content of hydromulch not to exceed 10%, plus or minus 3% as defined by the pulp and paper industry standards.

3. Water holding capacity of not less than 900 grams water per 100 grams fiber.

4. Nontoxic to plant life or animal life.
5. Non petroleum based organic tackifier and a green dye to allow for easy visual metering during application and noninjurious to plant growth.

6. Fiber to be dispersed into uniform slurry when mixed with water.

B. Stakes: Softwood lumber, chisel pointed.

C. String: Inorganic fiber.

2.4 SOURCE QUALITY CONTROL

A. Special Provisions, Section 01400, Quality Requirements.

B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

C. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.

D. Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of existing conditions before starting work.

B. Verify prepared soil base is ready to receive the Work of this section.

C. Verify compliance with requirements and for conditions affecting performance of work of this Section prior to starting any work. Report any defect, such as incorrect grading, incorrect subgrade elevations, and improper compaction or drainage problems, to the Engineer prior to beginning Work. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of Work indicates acceptance of filled subgrade areas to and responsibility for Work.

D. When conditions detrimental to work are encountered including, but not limited to, incorrect grading, adverse drainage conditions, poor soil conditions, or invasive species problems, immediately notify the Owner and/or Engineer before beginning any Work.

3.2 PREPARATION

A. Refer to the Supplemental Technical Specifications, Section 02900, Landscaping.

B. Correct any grading and drainage problems. Restore areas if erosion has occurred or Project Site has been disturbed.

C. Moisten prepared grass areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
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SOUTH PORTLAND, MAINE

3.3 SEEDING (ONLY FOR AREAS NOT HYDROSEEDED)

A. Sow seed with spreader or seeding machine.
B. Do not use wet seed or seed that is moldy or otherwise damaged.
C. Apply seed at rate per seed mix requirements evenly in two directions at right angles to each other. Rake in lightly into top 1/8 inch of topsoil.
D. Do not use wet seed or seed that is moldy or otherwise damaged.
E. Do not seed areas in excess of that which can be mulched on same day.
F. Schedule seeding when rain is not expected for 48 hours and within seasonal dates specified. Seed only when soil is in friable condition, not muddy, dried, or frozen.
G. Do not sow immediately following rain, when ground is too dry, when winds are over 12 mph or when temperatures are expected to be less than 45 or higher than 75 degrees Fahrenheit during and for two (2) weeks after seeding.
H. Roll seeded area with roller not exceeding 112 lbs/linear foot.
I. Immediately following seeding and compacting, apply mulch to thickness of 1/8 inches. Maintain clear of shrubs and trees.
J. Apply water with fine spray immediately after each area has been mulched. Saturate to four inches of soil.

3.4 SEEDING SLOPES GREATER THAN 3:1

A. Protect seeded areas with slopes exceeding 3:1 with specified erosion control blankets or bonded fiber matrix as indicated on Drawings and approved by the Engineer.
B. See Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.

3.5 HYDROSEEING

A. Protect adjacent and adjoining areas from hydroseeding overspray.
B. Mix specified seed, fertilizer, and premium wood fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with tackifier.
2. Apply the hydroseeding in the form of slurry consisting of organic soil amendments, commercial fertilizer, and any other recommended additives.
3. Apply slurry uniformly to all areas to be seeded in a one-step process. Spray the area with a visible uniform coat, using the dark color of the cellulose fiber as a visual guide.
Apply the slurry in a downward drilling motion via a fan stream nozzle. Ensure that all of the slurry components enter the mix with the soil.

4. Ensure the uniformity of the hydroseed application at a minimum rate of 1,500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.

5. Exercise special care to prevent any of the slurry from being sprayed onto any hardscape areas including paved surface, fences, walls, buildings, etc. Remove all slurry sprayed onto these surfaces at their own expense.

6. Save all seed and fertilizer tags and fiber mulch bags for the Engineer to verify compliance with the Drawings and Specifications.

3.6 SEED PROTECTION

A. Identify seeded areas with stakes and string around area periphery. Set string height to 24 inches. Space stakes as necessary.

B. The following are applicable only for areas where hydroseeding is NOT applied.

1. Cover seeded slopes where grade is 3:1 or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

2. Lay fabric smoothly on surface, bury top end of each section in six-inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.

3. Secure outside edges and overlaps at 36-inch intervals with stakes.

4. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

5. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum six inches.

3.7 MAINTENANCE

A. Mow grass at four times per year or as recommended by seed manufacturer. Do not cut more than 1/3 of grass blade at each mowing. Perform first mowing when seedlings are 40 percent higher than desired height.

B. Neatly trim edges and hand clip where necessary.

C. Immediately remove clippings after mowing and trimming. Do not let clippings lay in clumps.

D. Water to prevent grass and soil from drying out.

1. Provide all labor and water required to establish all grass areas. Water as required, during maintenance period to ensure the seed bed is thoroughly and evenly watered with a fine spray to penetrate the soil to a depth of at least four inches.
2. Keep seeded areas evenly moist until germination and satisfactory establishment.

3. Water in a manner to provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment.

E. Roll surface to remove minor depressions or irregularities.

F. Control growth of weeds.

   1. Apply herbicides only as necessary and as approved by the Engineer. Remedy damage resulting from improper use of herbicides.

G. Immediately reseed areas showing bare spots.

H. Repair washouts or gullies.

I. Protect seeded areas with warning signs during maintenance period.

J. Take immediate action to identify potential problems and undertake corrective measures in areas where a decline in the condition of grass seed areas is observed.

3.8 CLEAN UP

A. Promptly remove soil and debris created by grass work from paved areas. Clean wheels of vehicles before leaving Site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove erosion-control measures after satisfactory grass establishment and Site stabilization is complete.

END OF SECTION
SECTION 02930

PLANTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. References.

B. Definitions.

C. Submittals.

D. Closeout submittals.

E. Quality assurance.

F. Qualifications.

G. Delivery, storage, and handling.

H. Plant substitutions for plants not available.

I. Maintenance service.

J. Plant warranty.

K. Environmental requirements.

L. Plants: General.

M. Plant sources.

N. Soil amendments.

O. Accessories.

P. Site examination.

Q. Delivery, storage, and handling.

R. Adverse weather conditions.

S. Layout and planting sequence.

T. Soil protection during plant delivery and installation.

U. Soil moisture.

V. Installation of plants: General.
1.2 RELATED SECTIONS:

A. Supplemental Technical Specifications, Section 02226, Common Excavation, Embankments, and Compaction.

B. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.

C. Supplemental Technical Specifications, Section 02900, Landscaping.

D. Supplemental Technical Specifications, Section 02924, Seeding.

E. Supplemental Technical Specifications, Section 02931, Planting Soil.

1.3 REFERENCES

A. ANSI:


1.4 DEFINITIONS

A. Boxed trees: A container root ball package made of wood in the shape of a four-sided box.

B. Container plant: Plants that are grown in and/or are currently in a container including boxed trees.

C. Defective plant: Any plant that fails to meet the plant quality requirement of this specification.

D. End of Warranty Final Acceptance: The date when the Engineer accepts that the plants and work in this section meet all the requirements of the warranty.

E. Field grown trees (B&B): Trees growing in field soil for at least 12 months prior to harvest.

F. Healthy: Plants that are growing in a condition that expresses leaf size, crown density, color; and with annual growth rates typical of the species and cultivar’s horticultural description, adjusted for the planting site soil, drainage and weather conditions.

G. Kinked root: A root within the root package that bends more than 90 degrees.

H. Maintenance: Actions that preserve the health of plants after installation and as defined in this specification.

I. Maintenance period: The time period, as defined in this specification, which the Contractor is to provide maintenance.

J. Normal: the prevailing protocol of industry standard(s).

K. Reasonable and reasonably: When used in this specification relative to plant quality, it is intended to mean that the conditions cited will not affect the establishment or long-term stability, health or
growth of the plant. This specification recognizes that it is not possible to produce plants free of all defects, but that some accepted industry protocols and standards result in plants unacceptable to this Project.

L. When reasonable or reasonably is used in relation to other issues such as weeds, diseased, insects, it shall mean at levels low enough that no treatment would be required when applying recognized Integrated Plant Management practices.

M. This specification recognizes that some decisions cannot be totally based on measured findings and that professional judgment is required. In cases of differing opinion, Engineer’s shall determine when conditions are judged as reasonable.

N. Root ball: The mass of roots including any soil or substrate that is shipped with the tree within the root ball package.

O. Root ball package. The material that surrounds the root ball during shipping. The root package may include the material in which the plant was grown, or new packaging placed around the root ball for shipping.

P. Root collar (root crown, root flare, trunk flare, flare): The region at the base of the trunk where the majority of the structural roots join the plant stem, usually at or near ground level.

Q. Shrub: Woody plants with mature height approximately less than 15 feet.

R. Spade harvested and transplanted: Field grown trees that are mechanically harvested and immediately transplanted to the final growing site without being removed from the digging machine.

S. Stem: The trunk of the tree.

T. Substantial Completion Acceptance: The date at the end of the Planting, Planting Soil, and Irrigation installation where the Engineer accepts that all work in these sections is complete and the Warranty period has begun. This date may be different than the date of Substantial Completion for the other sections of the Project.

U. Stem girdling root: Any root more than ¼ inch diameter currently touching the trunk, or with the potential to touch the trunk, above the root collar approximately tangent to the trunk circumference or circling the trunk. Roots shall be considered as Stem Girdling that have, or are likely to have in the future, root to trunk bark contact.

1.5 SUBMITTALS

A. Special Provisions, Section 01330, Submittal Procedures.

B. Installer: Include lists of completed projects, with project names, addresses, phone numbers, and names and address of designers and clients.

C. Product Data: Submit data for the following:

1. Trees.
2. Shrubs.

D. Grower's Certificate: Certify Products meet or exceed specified requirements for the following:
   1. Trees.
   2. Shrubs.

E. Maintenance Schedule: Provide watering and fertilizing schedule to the Engineer for approval.

1.6 CLOSEOUT SUBMITTALS

A. Special Provisions, Section 01700, Execution and Closeout Requirements.

B. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

C. Warranty period Site visit record: If there is no maintenance during the warranty period, after each Site visit during the warranty period, by the Contractor, as required by this specification, submit a written record of the visit, including any problems, potential problems, and any recommended corrective action to the Engineer for approval.

1.7 QUALITY ASSURANCE

A. Substantial Completion Acceptance - Acceptance of the work prior to the start of the warranty period:
   1. Once the Contractor completes the installation of all items in this section, the Engineer will observe all work for Substantial Completion Acceptance upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of the observation.
   2. Substantial Completion Acceptance by the Engineer shall be for general conformance to specified size, character and quality and not relieve the Contractor of responsibility for full conformance to the contract documents, including correct species.
   3. Any plants that are deemed defective as defined under the provisions below shall not be accepted.

B. The Engineer will provide the Contractor with written acknowledgment of the date of Substantial Completion Acceptance and the beginning of the warranty period and plant maintenance period.

C. Contractor’s Quality Assurance Responsibilities: The Contractor is solely responsible for quality control of the work.

D. Installer Qualifications: The installer shall be a firm having at least five-years’ of successful experience of a scope similar to that required for the Work. The same firm shall install planting soil (where applicable) and plant material.
   1. The bidders list for work under this section shall be approved by the Engineer.
2. Installer Field Supervision: When any planting work is in progress, installer shall maintain, on Site, a full-time supervisor who can communicate in English with the Engineer.

3. Installer’s field supervisor shall have a minimum of five years of experience as a field supervisor installing plants and trees of the quality and scale of the proposed project and can communicate in English with the Engineer.

4. The installer’s crew shall have a minimum of three years of experience in the installation of Planting Soil, Plantings, and Irrigation (where applicable) and interpretation of soil plans, planting plans and irrigation plans.

5. Submit references of past projects, employee training certifications that support that the Contractors meets all of the above installer qualifications and applicable licensures.

E. If required, only use herbicides, pre-emergents, fertilizers, fungicides, and pesticides that meet local ordinance requirements and are reviewed and approved by the Engineer. Application to be performed by a licensed professional according to manufacturer's recommendations.

F. Select compatible products where options are provided.

G. Perform Work in accordance with applicable State of Maine Department of Transportation standards unless noted otherwise in this specification.

1.8 QUALIFICATIONS

A. Supplier: Company specializing in providing Products specified in this section.

B. Installer: Company specializing in performing work of this section with a minimum five years of successful experience of a scope similar to that required for the work, including the handling and planting of large specimen trees and shrubs in riparian areas. The same firm shall install planting soil (where applicable) and plant material.

1. Installer to provide an experienced supervisor on the Project Site during all times that landscape construction is in progress. Provide written qualification data for firms and persons to be responsible for Work, to demonstrate their capabilities and experience.

2. Installer’s field supervisor shall have a minimum of five years of experience as a field supervisor installing plants and trees of the quality and scale of the proposed Project.

3. The installer’s crew shall have a minimum of three years of experience in the installation of Planting Soil, Plantings, and Irrigation (where applicable) and interpretation of soil plans, planting plans and irrigation plans.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Special Provisions, Section 01600, Product Requirements.

B. Plant Selection: The Engineer reserves the right to select and observe all plants at the nursery prior to delivery and to reject plants that do not meet specifications as set forth in this specification. If a particular defect or substandard element can be corrected at the nursery, as determined by the Engineer, the agreed upon remedy may be applied by the nursery or the Contractor provided that
the correction allows the plant to meet the requirements set forth in this specification. Any work to correct plant defects shall be at the contractor’s expense.

1. The Engineer may make invasive observation of the plant’s root system in the area of the root collar and the top of the root ball in general in order to determine that the plant meets the quality requirements for depth of the root collar and presence of roots above the root collar. Such observations will not harm the plant.

2. Corrections are to be undertaken at the nursery prior to shipping.

C. The Contractor shall bear all cost related to plant corrections.

D. All plants that are rejected shall be immediately removed from the Site and acceptable replacement plants provided at no cost to the Owner.

E. Submit to the Engineer, for approval, plant sources including the names and locations of nurseries proposed as sources of acceptable plants, and a list of the plants they will provide. The plant list shall include the botanical and common name and the size at the time of selection. Only regionally sourced native stock, grown under conditions similar to the planting areas, or acclimatized to such conditions will be acceptable. Any changes must be approved by the Engineer. Observe all nursery materials to determine that the materials meet the requirements of this section.

1.10 PLANT SUBSTITUTIONS FOR PLANTS NOT AVAILABLE

A. Submit all requests for substitutions of plant species or size to the Engineer, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Requests shall also include sources of plants found that may be of a smaller or larger size, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution. Only regionally sourced native stock, grown under conditions similar to the planting areas, or acclimatized to such conditions will be acceptable as substitutions. Cultivars will not be permitted.

1.11 MAINTENANCE SERVICE

A. Special Provisions, Section 01700, Execution and Closeout Requirements.

B. Maintenance includes the inspection, watering, weeding, fertilizing, and/or replacement of unacceptable plants.

C. Maintain planting areas for one year from Date of Substantial Completion.

D. Extend the maintenance period for all planted areas until satisfactory plants are established.

E. In the event that planting is completed too late in the Fall for adequate establishment, continue maintenance into the following Spring and Fall and replant as necessary.

1.12 PLANT WARRANTY

A. Plant Warranty:
1. The Contractor agrees to replace defective work and defective plants. The Engineer shall make the final determination if plants meet these specifications or that plants are defective.

2. Plants warranty shall begin on the date of Substantial Completion Acceptance and continue for one (1) year and one (1) full growing season following Substantial Completion.

3. All plants shall be warranted to meet all the requirements for plant quality at installation in this specification. Defective plants shall be defined as plants not meeting these requirements. The Engineer shall make the final determination that plants are defective.

4. Plants determined to be defective shall be removed immediately upon notification by the Engineer and replaced without cost to the Owner, as soon as weather conditions permit and within the specified planting period.

5. Any work required by this specification or the Engineer during the progress of the work, to correct plant defects including the removal of roots or branches, or planting plants that have been bare rooted during installation to observe for or correct root defects shall not be considered as grounds to void any conditions of the warranty. In the event that the Contractor decides that such remediation work may compromise the future health of the plant, the plant or plants in question shall be rejected and replaced with plants that do not contain defects that require remediation or correction.

6. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.

7. The warranty of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended warranty period, the Engineer may elect one more replacement items or credit for each item. These tertiary replacement items are not protected under a warranty period.

8. During and by the end of the warranty period, remove all tree wrap, ties, and guying unless agreed to by the Engineer to remain in place. All trees that do not have sufficient caliper to remain upright, or those requiring additional anchorage in windy locations, shall be staked or remain staked, if required by the Engineer.

B. End of Warranty Final Acceptance - Acceptance of plants at the end of the warranty period.

1. At the end of the warranty period, the Engineer shall observe all warranted work, upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date for final observation.

2. End of Warranty Final Acceptance will be given only when all the requirements of the work under this specification and in specification sections Planting Soil have been met.

1.13 ENVIRONMENTAL REQUIREMENTS

A. Planting Restrictions: Plants must be installed prior to September 15 in order to allow for sufficient establishment before the winter dormant period. The preferred planting period is in the spring, between April 15 and June 15.
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B. Planting before or after the above referenced planting dates will increase the likelihood of plant establishment failure. Any deviation from the above referenced planting dates is undertaken at sole risk of the contractor and it is the responsibility of the contractor to provide any additional maintenance and watering which may be required to ensure satisfactory plant and seed establishment.

C. Planting outside of season to occur only with permission of the Engineer and may result in replanting the following season until satisfactory establishment is provided. Acceptance will not be given to areas planted outside of season until satisfactory growth has been established. Out-of-season planting during hot weather will require additional watering and may require shade mulching with netted hay-type erosion control fabric.

D. Planting under frozen conditions in either the spring or fall will not be permitted.

PART 2 PRODUCTS

2.1 PLANTS: GENERAL

A. Standards and measurement: Provide plants of quantity, size, genus, species, and variety as provided in Section B below.

1. All plants including the root ball dimensions or container size to trunk caliper ratio shall conform to ANSI Z60.1 “American Standard for Nursery Stock” latest edition, unless modified by provisions in this specification. When there is a conflict between this specification and ANSI Z60.1, this specification section shall be considered correct.

2. Plants larger than specified may be used if acceptable to the Engineer. Use of such plants shall not increase the contract price. If larger plants are accepted the root ball size shall be in accordance with ANSI Z-60.1. Larger plants may not be acceptable if the resulting root ball cannot be fit into the required planting space.

3. If a range of size is given, no plant shall be less than the minimum size and not less than 50 percent of the plants shall be as large as the maximum size specified. The measurements specified are the minimum and maximum size acceptable and are the measurements after pruning, where pruning is required.

B. Plant List and Seed Mix

1. Plant List

<table>
<thead>
<tr>
<th>Common</th>
<th>Botanical</th>
<th>Number</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Maple</td>
<td>Acer rubrum</td>
<td>9</td>
<td>6-7’</td>
</tr>
<tr>
<td>Speckled Alder</td>
<td>Alnus rugosa</td>
<td>35</td>
<td>5-6’</td>
</tr>
<tr>
<td>Smooth Alder</td>
<td>Alnus serrulata</td>
<td>38</td>
<td>5-6’</td>
</tr>
<tr>
<td>Serviceberry</td>
<td>Amelanchier canadensis</td>
<td>58</td>
<td>5-6’</td>
</tr>
<tr>
<td>Gray Birch</td>
<td>Betula populifolia</td>
<td>2</td>
<td>7-8’</td>
</tr>
<tr>
<td>Silky Dogwood</td>
<td>Cornus amomum</td>
<td>14</td>
<td>6-7’</td>
</tr>
<tr>
<td>Gray Dogwood</td>
<td>Cornus racemosa</td>
<td>9</td>
<td>6-7’</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Scientific Name</th>
<th>Quantity</th>
<th>Height Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redosier Dogwood</td>
<td><em>Cornus sericea</em></td>
<td>39</td>
<td>3-5’</td>
</tr>
<tr>
<td>Eastern Red Cedar</td>
<td><em>Juniperus virginiana</em></td>
<td>5</td>
<td>6-7’</td>
</tr>
<tr>
<td>White Pine</td>
<td><em>Pinus strobus</em></td>
<td>14</td>
<td>8-10’</td>
</tr>
<tr>
<td>Staghorn Sumac</td>
<td><em>Rhus typhina</em></td>
<td>64</td>
<td>8-10’</td>
</tr>
<tr>
<td>Elderberry</td>
<td><em>Sambucus canadensis</em></td>
<td>53</td>
<td>5-6’</td>
</tr>
<tr>
<td>Highbush Blueberry</td>
<td><em>Vaccinium corymbosum</em></td>
<td>26</td>
<td>2-2.5’</td>
</tr>
</tbody>
</table>

**TOTAL:** 366

2. Wetland Seed Mix

a. Description: The wetland seed mix should be equivalent to New England Wetland Plants, Inc. New England Wetmix (Wetland Seed Mix). This mix contains a wide variety of native seeds that are suitable for most wetland restoration sites that are not permanently flooded. All species are best suited to moist ground as found in most wet meadows, scrub shrub, or forested wetland restoration areas. The mix is well suited for detention basin borders and the bottom of detention basins not generally under standing water. The seeds will not germinate under inundated conditions. If planted during the fall months the seed mix will germinate the following spring. During the first season of growth several species will produce seeds while other species will produce seeds after the second growing season. Not all species will grow in all wetland situations. This mix is comprised of the wetland species most likely to grow in created/restored wetlands and should produce more than 75% ground cover in two full growing seasons.

b. Seed Mix Composition: Fox Sedge (Carex vulpinoidea), Lurid Sedge (Carex lurida), Blunt Broom Sedge (Carex scoparia), Blue Vervain (Verbena hastata), Fowl Bluegrass (Poa palustris), Hop Sedge (Carex lupulina), Green Bulrush (Scirpus atrovirens), Tickseed Sunflower/Bur Marigold (Bidens aristosa), Creeping Spike Rush (Eleocharis palustris), Fringed Sedge (Carex crinita), Soft Rush (Juncus effusus), Spotted Joe Pye Weed (Eupatorium maculatum), Rattlesnake Grass (Glyceria canadensis), Swamp aster (Aster puniceus), Blueflag (Iris versicolor), Swamp Milkweed (Asclepias incarnata), Square stemmed Monkey Flower (Mimulus ringens).

3. Riparian Seed Mix

a. Description: The riparian seed mix should be equivalent to New England Wetland Plants, Inc. New England Roadside Matrix Wet Meadow Seed Mix (Riparian Seed Mix). This mix contains native grasses, wildflowers, and shrubs that are blended together as a native matrix seed mix. In areas that receive frequent mowing, the cold season grasses will dominate, such as those areas closet to the roadway shoulder. In areas farther from the road, which may be mowed only once a year, or in hard to mow areas, such as around sign posts, the wildflower component will become dominant. Along cuts and side slopes which may never be mowed, the shrub component will add diversity and beauty to the roadside plantings. It is a particularly appropriate seed mix for roadsides, industrial sites, or cut and fill slopes.

b. Seed Mix Composition: River bank Wild Rye (Elymus riparius), Red Fescue (Festuca rubra), Switch Grass (Panicum virgatum), Blunt Broom Sedge (Carex scoparia), Smooth Panic Grass (Panicum dichotomiflorum), Lurid Sedge (Carex lurida), Green Bulrush
(Scirpus atrovirens) Blue Vervain (Verbena hastata), Nodding Bur Marigold (Bidens cernua), Spotted Joe Pye Weed (Eupatorium maculatum), Zigzag Aster (Aster prenanthoides/ Symphyotrichum prenanthoide), Hollow-Stem Joe Pye Weed (Eupatorium fistulosum/Eutrochium fistulosum) Elderberry (Sambucus canadensis), Silky Dogwood (Cornus amomum), Arrow Wood (Viburnum dentatum).

C. Proper Identification: All trees shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by genus, species, variety and cultivar.

D. Compliance: All trees shall comply with federal and state laws and regulations requiring observation for plant disease, pests, and weeds. Observation certificates required by law shall accompany each shipment of plants.

E. Plant Quality:

1. General: Provide healthy stock, grown in a nursery and reasonably free of die-back, disease, insects, eggs, bores, and larvae. At the time of planting all plants shall have a root system, stem, and branch form that will not restrict normal growth, stability and health for the expected life of the plant.

2. Plant quality above the soil line:

   a. Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified.

      1.) Crown: The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.

      2.) Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or over watering as indicated by wilted, shriveled, or dead leaves.

      3.) Branches: Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.

         a.) Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.

         b.) Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured one inch above the branch union.

         c.) The attachment of the largest branches (scaffold branches) shall be free of included bark.

      4.) Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions
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(mechnical injury).

5.) Temporary branches, unless otherwise specified, can be present along the lower trunk below the lowest main (scaffold) branch, particularly for trees less than one inch in caliper. These branches should be no greater than 3/8-inch diameter. Clear trunk should be no more than 40% of the total height of the tree.

b. Trees shall have one central leader. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present.

1.) All trees are assumed to have one central leader trees unless a different form is specified in the plant list or drawings.

c. Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stake may be used to maintain a straight leader in the upper half of the tree.

3. Plant quality at or below the soil line:

a. Plant roots shall be normal to the plant type specified. Root observations shall take place without impacting tree health.

b. The roots shall be reasonably free of scrapes, broken or split wood.

c. The root system shall be reasonably free of injury from biotic (e.g., insects and pathogens) and abiotic (e.g., herbicide toxicity and salt injury) agents. Wounds resulting from root pruning used to produce a high-quality root system are not considered injuries.

d. The root collar shall be within the upper two inches of the substrate/soil. Two structural roots shall reach the side of the root ball near the top surface of the root ball. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removes all stem girdling roots above the structural roots across the top of the root ball.

e. The root system shall be reasonably free of stem girdling roots over the root collar or kinked roots from nursery production practices.

f. At time of observations and delivery, the root ball shall be moist throughout. Roots shall not show signs of excess soil moisture conditions as indicated by stunted, discolored, distorted, or dead roots.

F. If a discrepancy is identified between these specifications and the planting details provided in the Contract Documents, the Contractor should seek clarification from the Engineer.

G. Submittals: Submit for approval the required plant quality certifications from the grower where plants are to be purchased, for each plant type. The certification must state that each plant meets all the above plant quality requirements.

1. The grower’s certification of plant quality does not prohibit the Engineer from observing any plant or rejecting the plant if it is found to not meet the specification requirements.
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2.2 PLANT SOURCES:
   A. Only regionally-sourced native stock, grown under conditions similar to the planting areas, or acclimatized to such conditions, will be acceptable. Cultivars will not be permitted.
   B. Proposed plant sources must be approved by the Engineer.

2.3 SOIL AMENDMENTS
   A. Fertilizer: Granular commercial grade; recommended for trees and shrubs; of proportion necessary to eliminate deficiencies of topsoil, as indicated in analysis.
      1. Consist of slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.
   B. Bone Meal: Raw, finely ground, commercial grade, minimum of three percent nitrogen and 20 percent phosphorous.
   C. Lime: Ground limestone, dolomite type, containing a minimum 89 percent calcium carbonate equivalent.
      1. Its value is based on chemical composition (calcium carbonate equivalent) and degree of fineness. Ground agricultural limestone is available as calcium carbonate (calcite) or as a mixture of calcium and magnesium carbonate (dolomite). Standard ground agricultural limestone contains a minimum of 89 percent calcium carbonate equivalent calcium carbonate plus (magnesium carbonate × 1.19).
      2. 95 percent passing a 20 mesh sieve, 60 percent passing a 60 mesh sieve, and 50 percent passing a 100 mesh sieve.
   D. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass. Includes hose and all other watering equipment required for the Work.
   E. Erosion Fabric: Erosion control matting, open weave.

2.4 ACCESSORIES
   A. Seed mix for areas between plants as per the Contract Documents.
   B. Erosion Control Mulch
   C. Stakes: Softwood lumber, chisel pointed.
   D. String: Inorganic fiber.

PART 3 EXECUTION

3.1 SITE EXAMINATION
   A. Examine the surface grades and soil conditions to confirm that the requirements of the Supplemental Technical Specifications, Section 02931, Planting Soil, and the soil and drainage
modifications indicated on the Planting Soil Plan and Details (if applicable) have been completed. Notify the Engineer in writing of any unsatisfactory conditions.

3.2 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of heat and cold temperatures. If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind. Provide adequate water to the root ball package during the shipping and storage period.

1. All plant materials must be available for observation prior to planting.

2. Using a soil moisture meter, periodically check the soil moisture in the root balls of all plants to assure that the plants are being adequately watered. Volumetric soil moisture shall be maintained above wilting point and below field capacity for the root ball substrate or soil.

B. Do not deliver more plants to the Site than there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.

1. The Engineer or Contractor shall approve the duration, method and location of storage of plants.

C. Provide protective covering over all plants during transporting.

3.3 ADVERSE WEATHER CONDITIONS

A. No planting shall take place during extremely hot, dry, windy or freezing weather.

3.4 LAYOUT AND PLANTING SEQUENCE

A. Relative positions of all plants and trees are subject to approval of the Engineer.

B. Notify the Engineer, one (1) week prior to layout. Layout all individual tree and shrub locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint for the Engineer’s approval. Secure the Engineer’s acceptance before digging and start of planting work.

C. When applicable, plant trees before other plants are installed.

D. It is understood that plants are not precise objects and that minor adjustments in the layout will be required as the planting plan is constructed. These adjustments may not be apparent until some or all of the plants are installed. Make adjustments as required by the Engineer including relocating previously installed plants.

3.5 SOIL PROTECTION DURING PLANT DELIVERY AND INSTALLATION

A. Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.

1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling. Where possible, restrict the driving lanes to one area
instead of driving over and compacting a large area of soil.

2. Till to a depth of six inches, all soil that has been driven over during the installation of plants.

3.6 SOIL MOISTURE

A. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Permanent wilting point</th>
<th>Field capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand, Loamy sand, Sandy loam</td>
<td>5-8%</td>
<td>12-18%</td>
</tr>
<tr>
<td>Loam, Sandy clay, Sandy clay loam</td>
<td>14-25%</td>
<td>27-36%</td>
</tr>
<tr>
<td>Clay loam, Silt loam</td>
<td>11-22%</td>
<td>31-36%</td>
</tr>
<tr>
<td>Silty clay, Silty clay loam</td>
<td>22-27%</td>
<td>38-41%</td>
</tr>
</tbody>
</table>

1. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.

B. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

3.7 INSTALLATION OF PLANTS: GENERAL

A. Observe each plant after delivery and prior to installation for damage of other characteristics that may cause rejection of the plant. Notify the Engineer of any condition observed.

B. No more plants shall be distributed about the planting bed area than can be planted and watered on the same day.

C. The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality in Part 2 Products: Plants General: Plant Quality. The Contractor shall undertake at the time of planting, all modifications to the root system required by the Engineer to meet these quality standards.

1. Modifications, at the time of planting, to meet the specifications for the depth of the root collar and removal of stem girdling roots and circling roots may make the plant unstable or stress the plant to the point that the Engineer may choose to reject the plant rather than permitting the modification.

2. Any modifications required by the Engineer to make the root system conform to the plant quality standards outlined in Part 2 Products: Plants General: Quality, or other requirements related to the permitted root ball package, shall not be considered as grounds to modify or void the plant warranty.

3. The resulting root ball may need additional staking and water after planting. The Engineer may
reject the plant if the root modification process makes the tree unstable or if the tree is not healthy at the end of the warranty period. Such plants shall still be covered under the warranty.

4. The Contractor remains responsible to confirm that the grower has made all required root modifications noted during any nursery observations.

D. Container and Boxed Root Ball Shaving: The outer surfaces of ALL plants in containers and boxes, including the top, sides and bottom of the root ball shall be shaved to remove all circling, descending, and matted roots. Shaving shall be performed using saws, knives, sharp shovels or other suitable equipment that is capable of making clean cuts on the roots. Shaving shall remove a minimum of one inch of root mat or up to two inches as required to remove all root segments that are not growing reasonably radial to the trunk.

E. Exposed Stem Tissue after Modification: The required root ball modifications may result in stem tissue that has not formed trunk bark being exposed above the soil line. If such condition occurs, wrap the exposed portion of the stem in a protective wrapping with a white filter fabric. Secure the fabric with biodegradable masking tape. DO NOT USE string, twine, green nursery ties or any other material that may girdle the trunk if not removed.

F. Excavation of the Planting Space: Using hand tools or tracked mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing or as noted below.

1. For trees and shrubs planted in soil areas that are NOT tilled or otherwise modified to a depth of at least 12 inches over a distance of more than 10 feet radius from each tree, or five feet radius from each shrub, the soil around the root ball shall be loosened as defined below or as indicated on the drawings.
   
   a. The area of loosening shall be a minimum of three times the diameter of the root ball at the surface sloping to two times the diameter of the root ball at the depth of the root ball.
   
   b. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand shovels.

2. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened as defined above for trees and shrubs planted in soil areas that are NOT tilled or otherwise modified.

3. The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.

4. If motorized equipment is used to deliver plants to the planting area over exposed planting beds, or used to loosen the soil or dig the planting holes, all soil that has been driven over shall be tilled to a depth of six inches.

G. For trees to be planted in prepared Planting Soil that is deeper than the root ball depth, compact the soil under the root ball using a mechanical tamper to assure a firm bedding for the root ball. If there is more than 12 inches of planting soil under the root ball excavate and tamp the planting soil in lifts not to exceed 12 inches.
H. Set top outer edge of the root ball at the average elevation of the proposed finish. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.

I. The Engineer may request that plants orientation be rotated when planted based on the form of the plant.

J. Backfill the space around the root ball with the same planting soil or existing soil that was excavated for the planting space. See Supplemental Technical Specifications, Section 02931, Planting Soil, for requirements to modify the soil within the planting bed.

K. Brace root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. DO NOT over compact the backfill or use mechanical or pneumatic tamping equipment. Over compaction shall be defined as greater than 85% of maximum dry density, standard proctor or greater than 250 psi as measured by a cone penetrometer when the volumetric soil moisture is lower than field capacity.

1. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.

L. Where indicated on the drawings, build a four-inch high, level berm of Planting Soil around the outside of the root ball to retain water. Tamp the berm to reduce leaking and erosion of the saucer.

M. Thoroughly water the Planting Soil and root ball immediately after planting.

N. Remove all nursery plant identification tags and ribbons as per Engineer instructions.

O. Install stakes as per the Drawings.

P. Seed areas between the plants as indicated on the Contract Documents and Design Plans with the seed mix specified above.

1. Wetland Seed
   a. Application Method: The wetland seeds in this mix can be sown by hand, with a hand-held spreader, or hydro-seeded on large or hard to reach sites. Lightly rake to insure good seed-to-soil contact. Seeding can take place on frozen soil, as the freezing and thawing weather of late fall and late winter will work the seed into the soil. If spring conditions are drier than usual watering may be required. If sowing during the summer months supplemental watering will likely be required until germination. A light mulch of clean, weed free straw is recommended.
   b. Application Rate: 18 pounds per acre or one pound per 2,500 square feet

2. Riparian Seed
   a. Application Method: This mix may be applied by hydroseeding, or by mechanical spreader.
Always apply on a clean, weed-free seed bed. After sowing, lightly rake or roll the site to improve seed-to-soil contact. Best results are obtained with a mid-late spring seeding. Summer seeding will benefit from a light mulching of clean, weed-free straw to conserve soil moisture and supplemental watering will likely be required until germination.

b. Application Rate: 18 pounds per acre or one pound per 2,500 square feet

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. References.

B. Definitions.

C. Install Compost into Planting Soil.

D. Clean up and disposal of all excess and surplus material.

1.2 RELATED SECTIONS:

A. Supplemental Technical Specifications, Section 02226, Common Excavation, Embankments, and Compaction.

B. Supplemental Technical Specifications, Section 02270, Slope Protection and Erosion Control.

C. Supplemental Technical Specifications, Section 02900, Landscaping.

D. Supplemental Technical Specifications, Section 02924, Seeding.

E. Supplemental Technical Specifications, Section 02930, Plantings.

1.3 REFERENCES

A. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the Specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail.


1.4 DEFINITIONS

A. Acceptable drainage: Drainage rate is sufficient for the plants to be grown. Not too fast and not too slow. Typical rates for installed Planting Soil are between one to five inches per hour. Turf soils are often higher, but drainage rates above two to three inches per hour will dry out very fast. In natural undisturbed soil a much lower drainage rate, as low as 1/8th inch per hour can still support good plant growth. Wetland plants can grow on top of perched water layers or even within seasonal perched water layers, but could become unstable in high wind events.

B. Amendment: material added to Topsoil to produce Planting Soil Mix. Amendments are classified as general soil amendments, fertilizers, biological, and pH amendments.

C. Biological Amendment: Amendments such as Mycorrhizal additives, compost tea or other products intended to change the soil biology.

D. Compacted soil: soil where the density of the soil is greater that the threshold for root limiting, and further defined in this specification.

E. Compost: well decomposed stable organic material as defined by the U.S. Composting Council and further defined in this specification.

F. Drainage: The rate at which soil water moves through the soil transitioning the soil from saturated condition to field capacity. Most often expressed as saturated hydraulic conductivity (Ksat; units are inches per hour).

G. End of Warranty Acceptance: The date when the Engineer accepts that the plants and work in this section meet all the requirements of the warranty. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation (if applicable) work run concurrent with each other, and further defined in this specification.

H. Existing Soil: Mineral soil existing at the locations of proposed planting after the majority of the construction within and around the planting site is completed and just prior to the start of work to prepare the planting area for soil modification and/or planting, and further defined in this specification.

I. Fertilizer: amendment used for the purpose of adjusting soil nutrient composition and balance.

J. Fine grading: The final grading of the soil to achieve exact contours and positive drainage, often accomplished by hand rakes or drag rakes other suitable devices, and further defined in this specification, and further defined in this specification.

K. Finished grade: surface or elevation of Planting Soil after final grading and 12 months of settlement of the soil, and further defined in this specification.

L. Graded soil: Soil where the A horizon has been stripped and relocated or re-spread; cuts and fills deeper than 12 inches, and further defined in this specification.
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M. Installed soil: Planting soil and existing site soil that is spread and or graded to form a planting soil, and further defined in this specification.

N. Minor disturbance: Minor grading as part of agricultural work that only adjusts the A horizon soil, minor surface compaction in the top six inches of the soil, applications of fertilizers, installation of utility pipes smaller than 18 inches in diameter thru the soil zone.

O. Planting Soil: Topsoil, or Planting Soil Mixes which are imported or existing at the Site, or made from components that exist at the Site, or are imported to the Site; and further defined in this specification.

P. Poor drainage: Soil drainage that is slower than that to which the plants can adapt. This is a wide range of metrics, but generally if the soil is turning grey in color it is reasonable preferable to either to plant moisture adaptive plants at smaller sizes that are young in age with shallow root balls or look at options to improve the drainage.

Q. Scarify: Loosening and roughening the surface of soil and sub soil prior to adding additional soil on top, and further defined in this specification.


S. Subgrade: surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing Planting Soil.

T. Substantial Completion: The date at the end of the Planting, Planting Soil, and Irrigation installation (if applicable) where the Engineer accepts that all work in these sections is complete and the Warranty period has begun. This date may be different than the date of Substantial Completion for the other sections of the Project, and further defined in this specification.

U. Topsoil: naturally produced and harvested soil from the A horizon or upper layers or the soil as further defined in this specification.

V. Undisturbed soil: Soils with the original A horizon intact that have not been graded or compacted. Soils that have been farmed, subjected to fire or logged but not graded, and natural forested land will be considered as undisturbed.

1.5 SUBMITTALS

A. Special Provisions, Section 01330, Submittal Procedures.

B. Submit manufacturer’s or supplier’s product data and literature certified analysis for standard products and bulk materials, complying with testing requirements and referenced standards.

1.6 QUALITY ASSURANCE

A. Select compatible products where options are provided.

B. Perform Work in accordance with applicable State of Maine Department of Transportation standards unless noted otherwise in this specification.
1.7 QUALIFICATIONS

A. Installer Qualifications: The installer shall be a firm having at least five years of experience of a scope similar to that required for the work, including the preparation, mixing and installation of soil mixes to support planting.

1. The bidders list for work under this section shall be approved by the Engineer.

2. Installer Field Supervision: When any Planting Soil work is in progress, installer shall maintain, on Site, an experienced full-time supervisor who can communicate with the Engineer.

3. Installer’s field supervisor shall have a minimum of five years’ experience as a field supervisor installing soil, shall be trained and proficient in the use of field surveying equipment to establish grades and can with the Engineer.

4. The installer’s crew shall be experienced in the installation of Planting Soil, plantings, and irrigation (where applicable) and interpretation of planting plans, soil installation plans, and irrigation plans (where applicable).

5. Submit references of past projects and employee training certifications that support that the Contractors meet all of the above installer qualifications and applicable licensures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Weather: Do not mix, deliver, place or grade soils when frozen or with moisture above field capacity.

B. Protect soil and soil stockpiles, including the stockpiles at the soil blender’s yard, from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Cover stockpiles with plastic sheeting or fabric at the end of each workday.

C. All manufactured packaged products and material shall be delivered to the Site in unopened containers and stored in a dry enclosed space suitable for the material and meeting all environmental regulations. Biological additives shall be protected from extreme cold and heat. All products shall be freshly manufactured and dated for the year in which the products are to be used.

D. Deliver all chemical amendments in original, unopened containers with original labels intact and legible, which state the guaranteed chemical analysis. Store all chemicals in a weather protected enclosure.

E. Bulk material: Coordinate delivery and storage with Engineer and confine materials to neat piles in areas acceptable to Engineer.

PART 2 PRODUCTS

2.1 IMPORTED TOPSOIL

A. Imported Topsoil definition: Fertile, friable soil containing less than 5% total volume of the
combination of subsoil, refuse, roots larger than one-inch diameter, heavy, sticky or stiff clay, stones larger than two inches in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth. The percent (%) of the above objects shall be controlled by source selection not by screening the soil. Topsoil shall be suitable for the germination of seeds and the support of vegetative growth. Imported Topsoil shall not contain weed seeds in quantities that cause noticeable weed infestations in the final planting beds. Imported Topsoil shall meet the following physical and chemical criteria:

1. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15 and 25% and a combined clay/silt content of no more than 55%.

2. pH value shall be between 5.5 and 7.0.


4. Soluble salt level: Less than 2 mmho/cm.

5. Soil chemistry suitable for growing the plants specified.

B. Stockpiled Existing Topsoil at the Site meeting the above criteria may be acceptable.

2.2 COMPOST

A. Compost: Blended and ground leaf, wood and other plant-based material, composted for a minimum of nine months and at temperatures sufficient to break down all woody fibers, seeds and leaf structures, free of toxic material at levels that are harmful to plants or humans. Source material shall be yard waste trimmings blended with other plant or manure-based material designed to produce Compost high in fungal material.


2. Compost shall comply with the following parameters:
   a. pH: 5.5 - 8.0.
   b. Soil salt (electrical conductivity): maximum 5 dS/m (mmhos/cm).
   c. Moisture content %, wet weight basis: 30 – 60.
   d. Particle size, dry weight basis: 98% pass through 3/4 inch screen or smear.
   e. Stability carbon dioxide evolution rate: mg CO2-C/ g OM/ day < 2.
   g. Physical contaminants (inerts), %, dry weight basis: <1%.
   h. Chemical contaminants, mg/kg (ppm): meet or exceed U.S. EPA Class A standard,
2.3 EXISTING SOIL (ACCEPTABLE FOR PLANTING WITH MINIMUM MODIFICATIONS)

A. General definition of existing soil: Surface soil in the areas designated on the soils plan as existing soil, that is not altered, compacted to root limiting density, graded or contaminated before or during the construction process and considered acceptable for planting and long term health of the plants specified either as it exists or with only minor modification.

1. The Engineer shall verify that the soil in the designated areas is suitable at the beginning of planting bed preparation work in that area. In the event that the work of this Project construction has damaged the existing soil in areas designated for use as Planting Soil to the point where the soil is no longer suitable to support the plants specified, the Engineer may require modification of the damaged soil up to and including removal and replacement with soil of equal quality to the soil that existed prior to construction. Examples of damage include further compaction, contamination, grading, creation of hard pan or drainage problems, and loss of the O, and or A horizon.

2. Do not begin work on additional modifications until changes to the contract price are approved by Engineer.

B. Protect existing soil from compaction, contamination, and degradation during the construction process.

C. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not increase compaction of soil to root limiting levels.

D. Modifications:

1. When results of soil tests recommend chemical adjustments, till surface soil to six inches or greater after chemical adjustments have been are applied.

2. Remove existing turf thatch, ground cover plants and weeds.

3. Provide pre-emergent weed control if indicated.

4. Make chemical adjustment as recommended by the soil test.

2.4 MODIFIED EXISTING SOIL (SOIL SUITABLE FOR PLANTING WITH INDICATED MODIFICATION)

A. General definition: Surface soil in the areas designated on the soils plan as Modified Existing Soil has been altered and or graded before or during the construction process but is still considered acceptable for planting and long-term health of the plants specified with the proposed modifications. Modifications respond to the soil problems expected or encountered. The Engineer shall verify that the soil in the designated areas is suitable for modification at the beginning of planting bed preparation work in that area.

1. The Engineer shall verify that the soil in the designated areas is suitable for the specified modification at the beginning of planting bed preparation work in that area. In the event
that the work of this Project construction has damaged the existing soil in areas designated for modification to the point where the soil is no longer suitable to support the plants specified with the specified modification, the Engineer may require further modification of the damaged soil up to an including removal and replacement with soil of equal quality to the soil that would have resulted from the modification. Damage may include further compaction, contamination, grading, creation of hard pan or drainage problem, and loss of the O, and or A horizon.

2. General requirements for all soil modifications:

   a. Take soil samples, test for chemical properties, and make appropriate adjustments.

   b. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not add to the compaction in the soil.

   c. All soil grading, tilling and loosening must be completed at times when the soil moisture is below field capacity. Allow soil to drain for at least two days after any rain event more than one inch in 24 hours, or long enough so that the soil does not make the hand muddy when squeezed.

   d. Provide pre-emergent weed control after the soil work is complete and plants planted but prior to adding mulch to the surface, if indicated by weed type and degree of threat.

B. Modified existing soil – soil removed, stockpiled, and spread.

   1. Description of condition to be modified: Existing soil that is suitable for reuse as Planting Soil but is in the wrong place of elevation or cannot be adequately protected during construction. Soil is to be harvested, stockpiled and re-spread with or without further modifications as indicated.

   2. Modifications:

      a. Excavate existing soil from the areas and to depths designated on the drawings. Stockpile in zones noted on the drawings or in areas proposed by the Contractor.

         1.) Prepare a soil stock pile plan for approval.

      b. Excavate soil using equipment and methods to preserve the clumps and peds in the soil. Generally, this means using the largest piece of equipment that is practical for the Project size and scope.

      c. Protect stock piles from erosion by compacting or tracking the soil surface, covering with breathable fabric or planting with annual grasses as appropriate for the season, location, and length of expected time of storage.

      d. Re-spread soil as required in Part 3 of this specification.

C. Modified existing soil – compacted surface soil
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1. Description of condition to be modified: Surface soil compaction to a maximum of 6 inches deep from traffic or light grading. Original A horizon may be previously removed or graded but lower profile intact with acceptable compaction levels and limited grading. The soil organic matter, pH and chemistry in the A horizon may not be suitable for the proposed plants and may need to be modified as required.

2. Modifications:
   a. Till top six inches or deeper of the soil surface, with a roto tiller, spade tiller, ripper or agricultural plow. Spread two to three inches of Compost on the surface of the tilled soil and make any chemical adjustment as recommended by the soil test.
   b. Till or disk the Compost into the loosened soil. Smooth out grades with a drag rake or drag slip.

D. Modified existing soil – low organic matter

1. Description of condition to be modified: Low soil organic matter and/or missing A horizon but soil is not compacted except for some minor surface compaction. The soil organic matter, pH and/or chemistry are likely not suitable for the proposed plants and should be modified as required.

2. Modifications:
   a. Spread three to four inches of Compost over the surface of the soil and make chemical adjustment as recommended by the soil test.
   b. Till Compost into the top six inches of the soil.

2.5 PLANTING SOIL MIXES

A. General definition: Mixes of Existing Soil or Imported Topsoil, Coarse Sand, and or Compost to make a new soil that meets the Project goals for the indicated planting area. These may be mixed off Site or on Site and will vary in Mix components and proportions as indicated.

B. Planting Mix - moderately slow draining soil for trees and shrub beds

1. A Mix of Imported Topsoil, Coarse Sand and Compost. The approximate Mix ratio shall be:

<table>
<thead>
<tr>
<th>Mix component</th>
<th>% by moist volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imported Topsoil unscreened</td>
<td>45-50%</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>40-45%</td>
</tr>
<tr>
<td>Compost</td>
<td>10%</td>
</tr>
</tbody>
</table>

2. Final tested organic matter between 2.75 and 4% (by dry weight).

3. Mix the Coarse Sand and Compost together first and then add to the Topsoil. Mix with a loader bucket to loosely incorporate the Topsoil into the Coarse Sand/Compost Mix. DO NOT OVER MIX! Do not mix with a soil blending machine. Do not screen the soil.
Clumps of Soil, Compost and Coarse Sand will be permitted in the overall Mix.

4. At the time of final grading, add fertilizer if required to the Planting Soil at rates recommended by the testing results for the plants to be grown.

PART 3 EXECUTION

3.1 EXAMINE SITE

A. Prior to installation of Planting Soil, examine Site to confirm that existing conditions are satisfactory for the work of this section to proceed.

1. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope toward the underdrain lines as shown on the drawings.

2. Confirm that surface all areas to be filled with Planting Soil are free of construction debris, refuse, compressible or biodegradable materials, stones greater than two inches diameter, soil crusting films of silt or clay that reduces or stops drainage from the Planting Soil into the subsoil; and/or standing water. Remove unsuitable material from the Site.

3. Confirm that no adverse drainage conditions are present.

4. Confirm that no conditions are present which are detrimental to plant growth.

5. Confirm that utility work has been completed per the drawings.

6. Confirm that irrigation work, which is shown to be installed below prepared soil levels, has been completed.

B. If unsatisfactory conditions are encountered, notify the Engineer immediately to determine corrective action before proceeding.

3.2 COORDINATION WITH PROJECT WORK

A. The Contractor shall coordinate with all other work that may impact the completion of the work.

B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.

C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Engineer of any conflicts encountered.

3.3 GRADE AND ELEVATION CONTROL

A. Provide grade and elevation control during installation of Planting Soil. Utilize grade stakes, surveying equipment, and other means and methods to assure that grades and contours conform to the grades indicated on the plans.
3.4 SITE PREPARATION

A. Excavate to the proposed subgrade. Maintain all required angles of repose of the adjacent materials as shown on the drawings or as required by this specification. Do not overexcavate compacted subgrades of adjacent pavement or structures. Maintain a supporting 1:1 side slope of compacted subgrade material along the edges of all paving and structures where the bottom of the paving or structure is above the bottom elevation of the excavated planting area.

B. Remove all construction debris and material including any construction materials from the subgrade.

C. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope approximately parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.

D. In areas where Planting Soil is to be spread, confirm subgrade has been scarified.

3.5 EXISTING SOIL MODIFICATION

A. Follow the requirements for modifying existing soil as indicated in Part 2 for the different types of soil modifications. The extent of the areas of different soil modification types are indicated on the Soils Plan or as directed by the Engineer.

3.6 PLANTING SOIL AND PLANTING SOIL MIX INSTALLATION

A. Prior to installing any Planting Soil from stockpiles or Planting Soil Mixes blended off Site, the Engineer shall approve the condition of the subgrade and the previously installed subgrade preparation and the installation of subsurface drainage.

B. All equipment utilized to install or grade Planting Soils shall be wide track or balloon tire machines rated with a ground pressure of four psi or less. All grading and soil delivery equipment shall have buckets equipped with six-inch long teeth to scarify any soil that becomes compacted.

C. In areas of soil installation above existing subsoil, scarify the subgrade material prior to installing Planting Soil.

1. Scarify the subsoil of the subgrade to a depth of three to six inches with the teeth of the back hoe or loader bucket, tiller or other suitable device.

2. Immediately install the Planting Soil. Protect the loosened area from traffic. DO NOT allow the loosened subgrade to become compacted.

3. In the event that the loosened area becomes overly compacted, loosen the area again prior to installing the Planting Soil.

D. Install the Planting Soil in 12-18 inch lifts to the required depths. Apply compacting forces to each lift as required to attain the required compaction. Scarify the top of each lift prior to adding more Planting Soil by dragging the teeth of a loader bucket or backhoe across the soil surface to roughen the surface.
E. Phase work such that equipment to deliver or grade soil does not have to operate over previously installed Planting Soil. Work in rows of lifts the width of the extension of the bucket on the loader. Install all lifts in one row before proceeding to the next. Work out from the furthest part of each bed from the soil delivery point to the edge of each bed area.

F. Where possible place large trees first and fill Planting Soil around the root ball.

G. Installing soil with soil or mulch blowers or soil slingers shall not be permitted due to the over mixing and soil ped breakdown cause by this type of equipment.

H. Where travel over installed soil is unavoidable, limit paths of traffic to reduce the impact of compaction in Planting Soil. Each time equipment passes over the installed soil it shall reverse out of the area along the same path with the teeth of the bucket dropped to scarify the soil. Comply with the paragraph “Compaction Reduction” (section 3.9) in the event that soil becomes over compacted.

I. The depths and grades shown on the drawings are the final grades after settlement and shrinkage of the compost material. The Contractor shall install the Planting Soil at a higher level to anticipate this reduction of Planting Soil volume. A minimum settlement of approximately 10-15% of the soil depth is expected. All grade increases are assumed to be as measured prior to addition of surface Compost till layer, mulch, or sod.

3.7 FINE GRADING

A. The Engineer shall approve all rough grading prior to the installation of Compost, fine grading, planting, and mulching.

B. Grade the finish surface of all planted areas to meet the grades shown on the drawings, allowing the finished grades to remain higher (10-15% of depth of soil modification) than the grades on the grading plan, as defined in paragraph Planting Soil Installation, to anticipate settlement over the first year.

C. Utilize hand equipment, small garden tractors with rakes, or small garden tractors with buckets with teeth for fine grading to keep surface rough without further compaction. Do not use the flat bottom of a loader bucket to fine grade, as it will cause the finished grade to become overly smooth and or slightly compressed.

D. Provide for positive drainage from all areas toward the existing inlets, drainage structures and or the edges of planting beds. Adjust grades as directed to reflect actual constructed field conditions of paving, wall and inlet elevations. Notify the Engineer in the event that conditions make it impossible to achieve positive drainage.

E. Provide smooth, rounded transitions between slopes of different gradients and direction. Modify the grade so that the finish grade before adding mulch and after settlement is one or two inches below all paving surfaces or as directed by the drawings.

F. Fill all dips and remove any bumps in the overall plane of the slope. The tolerance for dips and bumps in shrub and ground cover planting areas shall be a two-inch deviation from the plane in 10 feet. The tolerance for dips and bumps in lawn areas shall be a one-inch deviation from the plane in 10 feet.
3.8 CLEAN-UP

A. During installation, keep the Site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the Site no less than once a week.

1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the Project or on public right of ways and neighboring property.

B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the Site. The Engineer seals are to remain on the trees and removed at the end of the warranty period.

1. Make all repairs to grades, ruts, and damage to the work or other work at the Site.

2. Remove and dispose of all excess Planting Soil, subsoil, mulch, plants, packaging, and other material brought to the Site by the Contractor.

3.9 PLANTING SOIL AND MODIFIED EXISTING SOIL PROTECTION

A. The Contractor shall protect installed and/or modified Planting Soil from damage including contamination and over compaction due to other soil installation, planting operations, and operations by other Contractors or trespassers. Maintain protection during installation until acceptance. Utilize fencing and matting as required or directed to protect the finished soil work. Treat, repair or replace damaged Planting Soil immediately.

B. Loosen compacted Planting Soil and replace Planting Soil that has become contaminated as determined by the Engineer. Planting Soil shall be loosened or replaced at no expense to the Owner.

1. Till and restore grades to all soil that has been driven over or compacted during the installation of plants.

2. Where modified existing soil has become contaminated and needs to be replaced, provide imported soil that is of similar composition, depth and density as the soil that was removed.

3.10 PROTECTION DURING CONSTRUCTION

A. The Contractor shall protect planting and related work and other Site work from damage due to planting operations, operations by other Contractors or trespassers.

1. Maintain protection during installation until the date of plant acceptance (see specifications section – Planting). Treat, repair or replace damaged work immediately.

2. Provide temporary erosion control as needed to stop soil erosion until the Site is stabilized with mulch, plantings or turf.

B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants,
or any other parts of the work or existing features to remain, including large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Engineer shall determine when such cleaning, replacement or repair is satisfactory. Damage to existing trees shall be assessed by a certified arborist.

3.11 SUBSTANTIAL COMPLETION

A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.

B. The date of substantial completion of the planting soil shall be the date when the Engineer accepts that all work in the Plantings and Planting Soil Sections is complete.

3.12 FINAL ACCEPTANCE / SOIL SETTLEMENT

A. At the end of the plant warranty and maintenance period, (see Supplemental Technical Specifications, Section 02930, Plantings) the Engineer shall observe the soil installation work and establish that all provisions of the contract are complete and the work is satisfactory.

1. Restore any soil settlement and or erosion areas to the grades shown on the drawings. When restoring soil grades remove plants and mulch and add soil before restoring the planting. Do not add soil over the root balls of plants or on top of mulch.

B. Failure to pass inspection: If the work fails to pass final inspection, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Engineer.

END OF SECTION
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SECTION 02950  

LARGE WOODY ADDITIONS  

1.1 MATERIALS  

A. Wood for the following structure types and design details shown on the plans: Shall conform to the following requirements:  

1. Rootwads - Intact stumps should be taken from fresh, green trees with flattened root mass. The root fan shall have a diameter roughly equal to three feet. Root fans shall have relatively few broken branches and be securely attached to the trunk. The length of the rootwad, measured from the cut end of the stump to the bottom of the root system, shall be 10 to 30 feet. Specific length requirements for rootwads are listed in structure types below. Rootwads may be cut to length prior to delivery to the Site to facilitate transport. The remainder of the tree, after the rootwad is cut will be considered the tree top. All tree tops or crowns sourced from the same trees as the rootwads will also be delivered to the Site to be used in the rootwad brush slope protection and as non-structural elements in the restoration structures.  

2. Tree Tops - Tree Tops sourced from the trees harvested for rootwads will be delivered to the Site to be used in the rootwad brush slope protection and as non-structural elements in the restoration structures. Tree tops will be taken from fresh green trees with intact trunk and relatively few broken branches. The length of the Tree Tops including the trunk will be a minimum of 15 feet in length.  

3. Vertical Piles - Vertical piles to be used in anchoring the structures in place should be ten- to fifteen-foot long logs without rootwads attached cut from green trees with all limbs removed.  

B. Tree Species and Dimensions  

1. A mix of tree species to include at least 50% hemlock, with the remainder red maple. Amounts less than 25% of oak, ash, black locust, sugar maple, and silver maple may be accepted at the discretion of the overseeing fluvial geomorphologist. Tree diameters at breast height of eight to 12 inches (DBH) will be accepted with at least 50% greater than or equal to 10 inches (DBH).  

C. Source of Materials  

1. A representative sample of rootwads shall be approved by the fluvial geomorphologist prior to delivery to the Site. Logs to be used for this construction can be salvaged from the Project Site provided they meet the specification requirements, are within the limits of work, and are clearly flagged for clearing and grubbing.  

2. The contractor shall notify the fluvial geomorphologist a /minimum of 10 days prior to delivery of rootwad material to the Project Site of the proposed source of material. The contractor and fluvial geomorphologist shall jointly visit the source to determine whether the proposed rootwad material meets the contract requirements. An estimated 368 trees are required.
1.2 CONSTRUCTION METHODS

A. Rootwads will be installed under the direction of the fluvial geomorphologist.

1.3 STRUCTURE TYPES

A. Channel-Spanning Log Jam

1. Description – This work shall consist of constructing channel-spanning log jam structures as specified in the Contract Documents and as directed by the fluvial geomorphologist.

2. Materials Required – Each channel-spanning log jam shall consist of three channel-spanning rootwads and four vertical piles. Channel-spanning rootwads shall be of adequate length to cross the entire bankfull stream channel, measuring 20 to 30 feet. Rootwads utilized as vertical piles shall be a minimum of 10 feet in length.

3. Installation

   a. Channel-spanning log jam structures shall be installed according to the Construction Plans, as directed by the fluvial geomorphologist and the following specifications.

   b. Channel-spanning rootwads shall be laid across the stream channel in an overlapping or interlocking manner, as directed by the overseeing fluvial geomorphologist.

   c. Channel-spanning log jams should occupy more than 70 percent of the channel’s bankfull height.

   d. Vertical piles shall be driven into the existing stream bed and/or floodplain surface adjacent to the channel-spanning rootwads.

   e. Vertical piles shall be driven to a minimum depth of six feet or refusal.

   f. It may be necessary to cut a bevel or point on the driving end of the pile in order to drive it effectively.

   g. Contact between the rootfan and other structural members is preferred and may be necessary to help anchor the channel-spanning log jam.

   h. Wood installed as part of restoration is not intended to be mobile. Installed rootwads must be cabled or otherwise anchored to the satisfaction of the overseeing engineer / fluvial geomorphologist. Wood shall resist the expected forces of flow and buoyancy as determined by the overseeing engineer / fluvial geomorphologist.

B. Partial and Full Channel-Spanning Log Sill

1. Description – This work shall consist of constructing partial and full channel-spanning log sill structures as specified in the Contract Documents and as directed by the fluvial geomorphologist.

2. Materials Required – Each partial and full channel-spanning log sill shall consist of one rootwad and two vertical piles. Rootwads used in full channel-spanning sills shall be of
adequate length to cross the entire bankfull stream channel, measuring 20 to 30 feet. Rootwads used in partial channel-spanning sills shall be a minimum of 15 feet in length. Rootwads utilized as vertical piles shall be a minimum of 10 feet in length.

3. Installation

a. Partial and full channel-spanning log sill structures shall be installed according to the Construction Plans, as directed by the fluvial geomorphologist and the following specifications.

b. Rootwads utilized as sills shall be laid either partially or fully across the stream channel as directed by the overseeing fluvial geomorphologist.

c. Partial and full channel-spanning log sill structures should occupy 15 to 30 percent of the channel’s bankfull height.

d. Vertical piles shall be driven into the existing stream bed and/or floodplain surface adjacent to the rootwad sill.

e. Vertical piles shall be driven to a minimum depth of six feet or refusal.

f. It may be necessary to cut a bevel or point on the driving end of the pile in order to drive it effectively.

g. Contact between the rootfan and the sill member is preferred and may be necessary to help anchor the partial and full channel-spanning log sills.

h. Wood installed as part of restoration is not intended to be mobile. Installed rootwads must be cabled or otherwise anchored to the satisfaction of the overseeing engineer/fluvial geomorphologist. Wood shall resist the expected forces of flow and buoyancy as determined by the overseeing engineer/fluvial geomorphologist.

C. Floodplain Wood

1. Description – This work shall consist of constructing floodplain wood structures as specified in the Contract Documents and as directed by the fluvial geomorphologist.

2. Materials Required – Each floodplain wood structure depicted on the plans represents three individual floodplain wood structures consisting of one horizontal rootwad and two vertical piles for a total of three horizontal rootwads and six vertical piles for each structure shown on the plans. Rootwads installed horizontally on top of the existing or newly excavated floodplain shall be a minimum of 15 feet in length. Rootwads utilized as vertical piles shall be a minimum of 10 feet in length.

3. Installation

a. Floodplain wood structures shall be installed according to the Construction Plans, as directed by the fluvial geomorphologist and the following specifications.

b. Rootwads utilized as floodplain wood shall be laid on top of the existing or newly excavated floodplain surface as directed by the overseeing fluvial geomorphologist.
D. Rootwad Brush Slope Protection

1. Description – This work shall consist of constructing a rootwad brush slope protection structure as specified in the Contract Documents and as directed by the fluvial geomorphologist.

2. Materials Required – The rootwad brush slope protection structure as shown on the plans shall consist of 27 horizontal rootwads and eight vertical piles. Rootwads installed horizontally to form a wood buttress shall be a minimum of 15 feet in length. Rootwads utilized as vertical piles shall be a minimum of 10 feet in length.

3. Installation

   a. The rootwad brush slope protection structure shall be installed according to the Construction Plans, as directed by the fluvial geomorphologist and the following specifications.

   b. Rootwads utilized as structural members in the wood buttress shall be stacked in a roughly perpendicular and interlocking pattern as directed by the overseeing fluvial geomorphologist.

   c. Vertical piles shall be driven into the existing or newly excavated floodplain surface adjacent to the horizontal members of the wood buttress.

   d. Vertical piles shall be driven to a minimum depth of six feet or refusal.

   e. It may be necessary to cut a bevel or point on the driving end of the pile in order to drive it effectively.

   f. Contact between the rootwad and the horizontal member is preferred and may be necessary to help anchor the floodplain wood.

   g. Wood installed as part of restoration is not intended to be mobile. Installed rootwads must be cabled or otherwise anchored to the satisfaction of the overseeing engineer / fluvial geomorphologist. Wood shall resist the expected forces of flow and buoyancy as determined by the overseeing engineer / fluvial geomorphologist.
determined by the overseeing engineer / fluvial geomorphologist.

h. The stream-side face of the wood buttress should align with the existing bank both upstream and downstream of the structure.

i. Brush and tree tops shall be piled and / or stacked along the eroding bank between the structural members of the wood buttress and the top of the bank failure.

j. Brush and tree tops shall be mechanically packed or consolidated by the contractor in order to settle and fill the available space between the structural members of the wood buttress and the top of the bank failure.

k. A finished grade of approximately 3 to 1 will be established from the back of the wood buttress to the face of the bank failure.

l. The rootwad brush slope protection structure shall be completed to the satisfaction of the overseeing engineer/fluvial geomorphologist, who shall determine when a sufficiently stable structure has been achieved.

END OF SECTION
APPENDICES
APPENDIX A

LIST OF ADDITIONAL INSURED
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<td>BFE Ventures LLC</td>
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<td>133</td>
<td>Goodwill Industries of Northern New England</td>
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<td>137</td>
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<td>138</td>
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### Long Creek Board of Directors and Affiliates

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<tr>
<th>Affiliation</th>
<th>First Name</th>
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<th>Position</th>
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<tr>
<td>Long Creek Watershed Management District</td>
<td>Angela</td>
<td>Blanchette</td>
<td>Board Member</td>
</tr>
<tr>
<td>Long Creek Watershed Management District</td>
<td>Curtis</td>
<td>Bohlen</td>
<td>Treasurer</td>
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<tr>
<td>Long Creek Watershed Management District</td>
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<td>Colvin</td>
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<td>Dillon</td>
<td>Chair</td>
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<td>Sean</td>
<td>Donohue</td>
<td>Board Member</td>
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<td>Long Creek Watershed Management District</td>
<td>Eric</td>
<td>Dudley</td>
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<td>Brian</td>
<td>Goldberg</td>
<td>Secretary</td>
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<tr>
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<td>Craig</td>
<td>Gorris</td>
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<td>Haskell</td>
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<td>Henderson</td>
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<td>LaBrecque</td>
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<td>Palmer</td>
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<td>Doug</td>
<td>Roncarati</td>
<td>Vice Chair</td>
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<td>Michael</td>
<td>Vail</td>
<td>Board Member</td>
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<tr>
<td>Long Creek Watershed Management District</td>
<td>Peter</td>
<td>Carney</td>
<td>Executive Director</td>
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<tr>
<td>Cumberland County Soil &amp; Water Conservation District</td>
<td>Chris</td>
<td>Brewer</td>
<td>Project Administrator</td>
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<tr>
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<td>Heather</td>
<td>Huntt</td>
<td>Project Manager</td>
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<tr>
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<td>Baldwin</td>
<td>District Engineer</td>
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<tr>
<td>Cumberland County Soil &amp; Water Conservation District</td>
<td>Damon</td>
<td>Yakovelff</td>
<td>Environmental Planner</td>
</tr>
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</table>

Participating Landowners and their successors, the Long Creek Watershed Management District, the Cumberland County Soil & Water Conservation District, and their respective directors, officers, managers, members, agents and employees are intended to be covered under this certificate, whether or not they are named expressly.
APPENDIX B

PRELIMINARY SUBSURFACE EXPLORATION AND SLOPE EVALUATION REPORT,
MAIN STEM OF LONG CREEK (JULY 2016)
PRELIMINARY SUBSURFACE EXPLORATION AND SLOPE EVALUATION REPORT
MAIN STEM OF LONG CREEK
South Portland, Maine

July 2016
File No. 09.0025909.00

PREPARED FOR:
Long Creek Watershed Management District
Windham, Maine

GZA GeoEnvironmental, Inc.
477 Congress Street  |  Suite 700  |  Portland, Maine 04101
207.879.9190

28 Offices Nationwide
www.gza.com

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Via Email

July 7, 2016
File No. 09.0025909.00

Mr. Will Savage
Long Creek Watershed Management District
35 Main Street, Suite 3
Windham, Maine 04062

Re: Preliminary Subsurface Exploration and Slope Evaluation Report
Main Stem of Long Creek
South Portland, Maine

Dear Will:

We are pleased to provide this Preliminary Subsurface Exploration and Slope Evaluation Report associated with a future restoration project for the Main Stem of Long Creek in South Portland, Maine. Our work was completed in accordance with GZA GeoEnvironmental, Inc.’s (GZA’s) Subconsultant Agreement with Long Creek Watershed Management District (LCWMD) dated April 28, 2016, which incorporates the scope of work presented in GZA’s April 15, 2016 proposal, Change Order No. 1 dated May 10, 2016, and the Limitations in Appendix A of this report.

It has been a pleasure serving LCWMD on this phase of the project. If you have any questions regarding the report, or if we can provide further assistance, please do not hesitate to contact the undersigned.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Nicholas V. Williams, E.I.T.
Engineer I

Christopher L. Snow, P.E.
Associate Principal

Andrew R. Blaisdell, P.E.
Consultant Reviewer

Attachment: Preliminary Subsurface Exploration and Slope Evaluation Report
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APPENDIX B TEST BORING LOGS
APPENDIX C STABILITY SECTION LOCATIONS AND RESULTS
1.0 INTRODUCTION

This report presents the results of GZA GeoEnvironmental, Inc.’s (GZA’s) preliminary subsurface exploration and slope evaluation associated with a future restoration project for the Main Stem of Long Creek in South Portland, Maine. Our services were provided in accordance with GZA’s April 28, 2016 Subconsultant Agreement with Long Creek Watershed Management District (LCWMD), which incorporates the scope of work presented in GZA’s April 15, 2016 proposal and Change Order No. 1; and the Limitations contained in Appendix A of this report.

1.1 BACKGROUND

The project site is located between Maine Mall Road and Foden Road in South Portland, Maine, as shown on the attached Project Locus, Figure 1. The flood plain of the Main Stem of Long Creek passes through and is adjacent to developed properties of several participating landowners. As a result of commercial development, artificial fill now encroaches on several reaches of the formerly broad floodplain of the Main Stem, and large portions of the area no longer contain impervious cover.

LCWMD is considering a future restoration that includes removal and/or regrading of identified fill areas to a 2 horizontal to 1 vertical (2H:1V) slope to broaden the existing floodplain. Proposed restoration areas are shown on the Boring Location Plan, Figure 2. The preliminary boring data and stability analyses presented herein provide a basis for future design of a floodplain restoration project along the Main Stem.

1.2 OBJECTIVES AND SCOPE OF SERVICES

The objectives of our work were to evaluate subsurface conditions and to provide preliminary geotechnical engineering recommendations and construction considerations for the proposed project. To meet these objectives, GZA completed the following Scope of Services:

- Coordinated DigSafe® utility clearance activities and retained and coordinated with DigSmart for supplemental utility clearance;
- Coordinated and observed GZA’s subsurface exploration program, consisting of seven test borings and two hand probes, including field screening for volatile organic compounds (VOCs);
- Conducted preliminary analyses to assess the stability of proposed slope modifications; and
- Prepared this report summarizing our findings and recommendations.

2.0 SUBSURFACE EXPLORATIONS

GZA completed a subsurface investigation program consisting of seven test borings and two hand probes. The approximate as-drilled locations were determined using a hand-held GPS unit and are shown on Figure 2. Ground surface elevations at the boring and probe locations were estimated by interpolating between contours shown on the plans included in Appendix C. Elevations referenced in this report are in feet and refer to North American Vertical Datum of 1988.
Northern Test Boring of Gorham, Maine provided drilling services and completed Digsafe® utility clearance for the project with coordination by GZA. To provide additional assessment of potential buried utilities in the work areas, GZA retained Digsmart, who conducted utility locating services to check the specific boring locations for the presence of buried utilities.

Drilling was completed on June 13, 2016. Test borings were drilled using an ATV-mounted drill rig. The borings were sampled to depths of approximately 19 to 27 feet below ground surface (bgs). Where clay was found to be present upon reaching the lowest sampling depth in the test borings, a rod probe was hydraulically advanced to refusal to assess the overall thickness of the deposit, resulting in total probe depths of approximately 21 to 67 feet bgs. Borings were terminated upon reaching refusal during sampling (GZ-7 only) or refusal of the rod probe. GZA personnel monitored the drilling work and prepared logs of each boring that are included in Appendix B.

Borings GZ-1, GZ-5 and GZ-8A were drilled with 2-1/4-inch inside diameter hollow stem augers. Borings GZ-2, GZ-4, GZ-6 and GZ-7 were drilled using 4-inch casing and drive and wash drilling techniques. Standard penetration testing and split spoon sampling were performed at 5-foot typical intervals using a 24-inch-long, 1-3/8-inch inside diameter sampler. The sampler was driven using a 140-lb chain-drive, automatic hammer, with a rated energy of 97 percent.

In stiffer cohesive deposits, a pocket penetrometer was used to assess the shear strength of the soil. Pocket penetrometer test results are presented on the logs in Appendix B. Field vane shear tests were performed at selected depths in softer cohesive deposits using a 3-5/8 by 8-inch Acker vane to assess the in-situ, undrained shear strength of cohesive deposits. Raw torque readings and correlated shear strength values for both peak and remolded conditions are presented on the boring logs in Appendix B. A split spoon was driven through each vane interval to recover the material for classification.

Samples were screened for VOCs using a photoionization detector outfitted with a 10.6 eV lamp. Field vane shear tests were performed in borings GZ-1, GZ-2, GZ-4, GZ-5, and GZ-6 followed by a split spoon to recover the material. The borings were generally backfilled with soil cuttings.

Hand Probes GZ-HP-3 and GZ-HP-8 were completed by GZA using a hand auger and Geonor hand-held vane tester. Field vanes were attempted in both hand probe locations; however, the material was too stiff to insert the vane.

3.0 SUBSURFACE CONDITIONS

3.1 SURFICIAL GEOLOGY

Based on available literature, surficial geologic units mapped in the area include fill and Presumpscot Formation marine deposits, typically including silty clay and sand deposited on the sea floor during the late-glacial marine submergence. Artificial fill was placed above the marine deposits during development of the area.

3.2 SUBSURFACE SOIL PROFILE

Three soil units were encountered in the test borings: Fill, Marine Deposits, and Sand. The encountered thicknesses and generalized description are presented in the following table, in descending order from ground surface.
<table>
<thead>
<tr>
<th>Soil Unit</th>
<th>Approx. Encountered Thickness (ft)</th>
<th>Generalized Description</th>
</tr>
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<tr>
<td>Fill</td>
<td>1 to 11</td>
<td>Variable, ranging from very loose to loose, brown and tan, fine to coarse SAND, little to some Silt, trace to some Gravel (&quot;Fill&quot; on logs); to very soft to medium stiff, gray, SILT &amp; CLAY to Silty CLAY, trace to little fine Sand with organics, roots, wood, and leaf matter (&quot;Clay Fill&quot; on logs). Approximately 1 to 6 inches of topsoil was present in all borings except GZ-1 and GZ-HP-3. Fill was encountered in all of the borings.</td>
</tr>
<tr>
<td>Marine Deposit</td>
<td>18 to 62</td>
<td>Approximately 5 to 10 feet of very stiff to stiff, olive-gray, Silty CLAY, trace fine Sand (Clay Crust). Underlain by soft, gray, Silty CLAY, trace to little fine Sand. An approximately 5-foot thick layer of SILT &amp; CLAY with organics, root fibers and wood was encountered in GZ-4. Marine deposit was encountered in all of the borings.</td>
</tr>
<tr>
<td>Sand</td>
<td>6</td>
<td>Medium dense to very dense, gray, fine to coarse SAND, trace to some Silt, trace to some Gravel. Encountered in GZ-7 only.</td>
</tr>
<tr>
<td>Refusal (Split Spoon or Hydraulic Probe)</td>
<td>20.9 to 66.8 ft bgs (El. 18.6 to -16.3)</td>
<td>Encountered in all test borings (not hand probes)</td>
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</table>

The average VOC levels measured for each boring during sample screening ranged from 6.1 to 7.8 ppm. The background reading from the detector was approximately 5 ppm. Detailed descriptions of the materials encountered at specific locations are provided in the boring logs in Appendix B.

3.2.1 Groundwater

Groundwater levels were measured in the completed boreholes immediately after drilling was completed. There was no free water observed in borings GZ-5 and GZ-8A where the hollow stem auger was used, and the measured groundwater level in GZ-1 was 20.1 feet bgs. Groundwater levels measured in the completed drive and wash boreholes were influenced by the introduction of water during drilling. Based on the moisture content of the samples from the test borings, the groundwater levels at the boring locations are estimated to be at or near the top of the marine deposits.

The groundwater observations were made at the times and under the conditions stated in the boring logs. Groundwater levels fluctuate due to season, precipitation, infiltration and construction activity in the area. Therefore, groundwater levels during and after construction are likely to vary from those encountered at the time of the test borings.

4.0 ENGINEERING EVALUATIONS

4.1 PRELIMINARY STABILITY EVALUATIONS

LCWMD is considering a future restoration that includes removal and/or regrading of the identified fill areas to a 2H:1V slope to broaden the existing floodplain. GZA completed preliminary stability analyses to assess the factors of safety against rotational failures of conceptual future slope modifications. Additional explorations and stability analyses will be required for final design of slopes for the future project.
The currently contemplated slope modifications include removal of existing fill and leaving a typical slope angle of 2H:1V from the top of the cut to the general floodplain elevation at each location. In order to develop slope sections for analysis, GZA developed ground surface profiles from the CAD drawings and imported them directly into the analysis software. The locations of the ground surface profiles selected for analysis are shown on the figures in Appendix C.

Subsurface stratification was developed for each location based on the test boring logs and typical strength profiles developed for the analyzed deposits. Subsurface materials at the floodplain modification areas include granular and/or cohesive fill material overlying marine deposits with a medium stiff to stiff clay crust, and softer underlying marine deposit layer. Refusal depths encountered in the borings were used as the limiting depths below which a failure surface may not develop.

Strength and unit weight of the fill were developed by correlation to Standard Penetration Test (SPT) N-values from the borings, corrected for overburden thickness and hammer energy, and based on GZA local experience. Strength and unit weight of the crust and softer layer of the marine deposits were developed by correlation to corrected SPT N-values, pocket penetrometer tests and field vane shear tests from the borings, and based on GZA local experience. An additional stratum is shown on the cross sections representing the conceptual limits of Fill material to be excavated. The “excavated fill” layer was included in the cross sections for clarity, but was assigned with negligible strength and unit weight properties so therefore did not influence the analyses.

GZA evaluated the stability of the conceptual future slopes using the computer analytical software Slope/W 2012, developed by Geo-Slope International, based on the Modified Bishop method. Eight cross-sections were analyzed, one at each exploration location. A grid and radius search technique was used to identify the slip surface with the lowest factor of safety. The plan locations, slope input models and results of analyses are included in Appendix C. Plotted contours above each slope indicate relative factors of safety associated with center points of the analyzed circular surfaces.

The table that follows summarizes the modeled strengths of the analyzed subsurface layers, and the calculated minimum safety factors resulting from the analyses.

<table>
<thead>
<tr>
<th>Section</th>
<th>Strength Properties</th>
<th>Preliminary Calculated Factor of Safety</th>
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<tr>
<td>1-1</td>
<td>Fill Friction Angle (degrees) 32</td>
<td>Clay Crust Su (psf) 1100</td>
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<tr>
<td>2-2</td>
<td>32</td>
<td>800</td>
</tr>
<tr>
<td>3-3</td>
<td>32</td>
<td>800</td>
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<td>1100</td>
</tr>
<tr>
<td>8-8</td>
<td>32</td>
<td>1100</td>
</tr>
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</table>
Preliminary stability analyses summarized in the table assess the factors of safety against rotational failures of conceptual future slope modifications, and are not considered suitable for final design or construction. Additional explorations and stability analyses will be required for final design and construction of slopes for the future project.

The preliminary results indicate that the conceptual future 2H:1V slopes have calculated safety factors of 1.1 to 1.9 against rotational instability. Since a factor of safety of at least 1.5 is considered acceptable for permanent slopes, the preliminary results indicate that the conceptual proposed 2H:1V slopes are suitable at sections 1-1, 3-3, 4-4, 6-6, 7-7, and 8-8, and they are unsuitable at sections 2-2 and 5-5.

Although analysis of the existing stability was not part of the scope of this work, it is important to point out that the proposed slope at section 5-5 is very similar to the existing slope. Therefore, our preliminary analyses indicate that it is likely that the current slope has a factor of safety on the order of 1.1. Based on the preliminary analyses, a rotational failure of the slope could extend 50 to 80 feet uphill from the top of slope.

The conceptual proposed section 2-2 includes an approximately 10-foot-high by 20-foot-wide area of fill to be excavated at the toe of the slope, which will reduce the calculated safety factor relative to the existing condition. In our judgment, analyses of the existing condition may show a factor of safety against rotational failure of 1.5 or higher.

5.0 PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

- For preliminary analyses, a factor of safety of at least 1.5 is considered acceptable for permanent slopes.
- The preliminary results show that the conceptual 2H:1V embankment slopes could provide a safety factor of at least 1.5 against long term instability at sections 1-1, 3-3, 4-4, 6-6, 7-7, and 8-8.
- It is our opinion that the existing conditions, prior to proposed excavation of fill, at sections 1-1, 3-3, 4-4, 6-6, 7-7, and 8-8 have a factor of safety of at least 1.5 against rotational failure. This is due to the fact that the proposed fill excavation would lower the calculated factor of safety for these slopes.
- The current slope at section 2-2 includes an approximately 10-foot-high by 20-foot-wide area of fill proposed to be excavated at the toe of the slope. In our judgment, analyses of the existing condition may show a factor of safety against rotational failure of 1.5 or higher. Slope stability of the existing condition should be analyzed to confirm that the calculated factor of safety is at least 1.5 for the existing condition.
- Based on the preliminary results, it is our opinion that the current slope at section 5-5 has a factor of safety on the order of 1.1. In our opinion, a rotational failure of the slope could occur and extend 50 to 80 feet uphill from the top of slope. Given the low factor of safety, consideration should be given to restricting use of the area, and completing additional geotechnical evaluation of the slope.
- Additional geotechnical evaluation should be performed at section 5-5 and should include supplemental subsurface exploration, undisturbed tube sampling, in-situ and laboratory shear strength testing, and revised stability analysis, in order to develop a more detailed, site-specific strength profile of the marine deposits and update stability analyses at that location.
The stability analyses included herein are based on conceptual grading and estimated soil properties, and are preliminary in nature. Additional subsurface exploration, laboratory testing and stability analyses are required for final design of the proposed slopes.

6.0 CONSTRUCTION CONSIDERATIONS

- Future slope modifications designed with slope angles of 2H:1V or flatter should be provided with loam and seed for permanent erosion protection.

- In the event that seepage is encountered in the excavated slopes, the geotechnical engineer should be consulted to consider toe drains or other means of controlling seepage, and maintaining stability of the cut slopes.
Figures
NOTE: BACKGROUND INFORMATION FOR PLAN WAS PROVIDED BY LCWMD IN A DRAWING LABELED "BORING EXHIBITS_4—5—16.DWG" ON JUNE 16, 2016. APPROXIMATE AS DRILLED BORING LOCATIONS AND GLOBAL STABILITY CROSS-SECTIONS WERE ADDED BY GZA.
Appendix A – Limitations
LIMITATIONS

Use of Report
1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care
2. GZA’s findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.

3. GZA’s services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions
4. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

5. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

6. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

7. GZA’s services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.
8. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations
9. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Additional Services
10. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.
Appendix B – Boring Logs
## LOG KEY

**BURMISTER SOIL CLASSIFICATION (INORGANIC)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Name</th>
<th>Proportional Term</th>
<th>Percent By Weight</th>
<th>Identification of Fines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Gravel, Sand, Fines*</td>
<td>&gt;50</td>
<td>SILT</td>
<td>0</td>
</tr>
<tr>
<td>Minor</td>
<td>Gravel, Sand, Fines*</td>
<td>and some</td>
<td>Clayey SILT</td>
<td>1-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>little</td>
<td>SILT &amp; CLAY</td>
<td>5-10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>trace</td>
<td>CLAY &amp; SILT</td>
<td>10-20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Silty CLAY</td>
<td>20-40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CLAY</td>
<td>&lt;40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*See identification of fines table.

**PLASTIC SOILS**

<table>
<thead>
<tr>
<th>Gradation Designation</th>
<th>Proportion of Component</th>
<th>Consistency</th>
<th>Blows/ft. SPT N-Value</th>
<th>Plastic &amp; Sand</th>
<th>Density</th>
<th>Blows/ft. SPT N-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine to coarse</td>
<td>All fractions &gt; 10%</td>
<td>Very Soft</td>
<td>&lt;2</td>
<td>Very Loose</td>
<td>&lt;4</td>
<td></td>
</tr>
<tr>
<td>Medium to coarse</td>
<td>&lt;10% fine</td>
<td>Soft</td>
<td>2-4</td>
<td>Loose</td>
<td>4-10</td>
<td></td>
</tr>
<tr>
<td>Coarse</td>
<td>&lt;10% coarse</td>
<td>Medium Stiff</td>
<td>4-8</td>
<td>Medium Dense</td>
<td>10-30</td>
<td></td>
</tr>
<tr>
<td>Coarse</td>
<td>&lt;10% fine and medium</td>
<td>Stiff</td>
<td>8-15</td>
<td>Dense</td>
<td>30-50</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>&lt;10% coarse and fine</td>
<td>Very Stiff</td>
<td>15-30</td>
<td>Very Dense</td>
<td>&gt;50</td>
<td></td>
</tr>
<tr>
<td>Fine</td>
<td>&lt;10% coarse and medium</td>
<td>Hard</td>
<td>&gt;30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BURMISTER SOIL CLASSIFICATION (ORGANIC)**

Fibrous PEAT (Pt) - Lightweight, spongy, mostly visible organic matter, water squeezes readily from sample. Typically near top of deposit.

Fine Grained PEAT (Pt) - Lightweight, spongy, little visible organic matter, water squeezes readily from sample. Typically below fibrous peat.

Organic Silt (OL) - Typically gray to dark gray, often has strong H2S odor. Typically contains shells or shell fragments. Lightweight. Usually found near coastal regions. May contain wide range of sand fractions.

Organic Clay (OH) - Typically gray to dark gray, high plasticity. Usually found near coastal regions. May contain wide range of sand fractions. Need organic content test for final identification.

**UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) (ASTM D 2487)**

**MAJOR DIVISIONS**

- Coarse Grained Soils
  - More than 50% of material larger than No. 200 sieve
  - Gravel
  - Coarse Gravel (Little or no fines) with Gravel
  - Clean Gravels (Little or no fines) with Gravel
  - Gravel with Fines (Appreciable amount of fines) with Gravel
  - Clean Sands (Little or no fines) with Sand
  - Sand with Fines (Appreciable amount of fines) with Sand
  - Silts and Clays Liquid Limit <50
  - Silts and Clays Liquid Limit >50
  - Highly Organic Soils

- Fine Grained Soils
  - More than 50% of material smaller than No. 200 sieve

**GROUP SYMBOLS**

- GW = Gravel
- GP = Gravel (P)
- GM = Gravel (M)
- GC = Gravel (C)
- SW = Sand
- SP = Sand (P)
- SM = Sand (M)
- SC = Sand (C)
- ML = Silts and Clays
- CL = Silts and Clays (L)
- OL = Organic Soils
- MH = Organic Soils (H)
- OH = Organic Soils (H)
- Pt = Organic Soils (T)

**ABBREVIATIONS**

- MR = Mud Rotary
- HSA = Hollow Stem Auger
- SSA = Solid Stem Auger
- USCS = Unified Soil Classification System (ASTM D 2487)
- NYCBC = New York City Building Code
- WOR = Weight of Rods
- WOH = Weight of Hammer
- SPT = Standard Penetration Test (ASTM D 1586)
- N-Value = Cumulative number of uncorrected blows for the middle two 6-inch intervals (blows/foot).
<table>
<thead>
<tr>
<th>Sample</th>
<th>Depth (ft)</th>
<th>Pen. (in)</th>
<th>Rec. (in)</th>
<th>Blows (per 6 in)</th>
<th>SPT Value</th>
<th>Sample Description and Identification (Modified Burmister Procedure)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>0.0-2.0</td>
<td>24</td>
<td>18</td>
<td>2 2 1 1 3</td>
<td></td>
<td>S1: Very loose to loose, brown and tan, medium to coarse SAND, little organic Silt, trace Gravel, dry. (SM)</td>
<td>1</td>
</tr>
<tr>
<td>S1</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>5.0-7.0</td>
<td>24</td>
<td>18</td>
<td>WOR WOR 1</td>
<td>1</td>
<td>S2: Soft, gray, SILT &amp; CLAY, little fine Sand, with organics, wet. Roots throughout sample. (ML)</td>
<td>2</td>
</tr>
<tr>
<td>S3</td>
<td>10.0-12.0</td>
<td>24</td>
<td>22</td>
<td>3 4 6 6</td>
<td>10</td>
<td>S3: Very stiff, gray and light brown, Silty CLAY, trace fine Sand. Vertical Sand seam throughout sample (1/16&quot; - 1/8&quot;). (CL) Pocket Penetrometer Undrained Shear Strength, $S_u = 2.25$ ksf</td>
<td>3</td>
</tr>
<tr>
<td>S4</td>
<td>15.0-17.0</td>
<td>24</td>
<td>20</td>
<td>2 2 2 4</td>
<td></td>
<td>S4: Medium stiff, olive, Silty CLAY, little fine Sand, wet. (CL)</td>
<td>4</td>
</tr>
<tr>
<td>S5</td>
<td>20.0-22.0</td>
<td>24</td>
<td></td>
<td>WOH WOH WOH WOH</td>
<td>0</td>
<td>S5: Soft, olive to dark gray, Silty CLAY, wet. (CL)</td>
<td>5</td>
</tr>
<tr>
<td>S6</td>
<td>25.0-27.0</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>V1</td>
<td>27.0</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>V1: Field Vane, $T_{raw} = 35$/10 ft. lbs.; Undrained Shear Strength, $S_u = 380/110$ psf</td>
<td>7</td>
</tr>
<tr>
<td>V2</td>
<td>25.4-26.0</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>V2: Field Vane, $T_{raw} = 38/9$ ft. lbs.; $S_u = 410/100$ psf</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>26.4-27.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
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</tbody>
</table>

**Remarks**

1. Field test data indicates field screening of head space samples for volatile organic vapors with a photoionization detector (PID) equipped with a 10.6 eV lamp. Background reading of PID was 5.0 ppm.
2. Water level measured immediately after rod probe and augers were removed from borehole.
3. $T_{raw}$ is measured torque from field; $S_u$ is correlated undrained shear strength. Higher and lower $T_{raw}$ and $S_u$ values correspond to peak and remolded values, respectively.
4. Advanced rod probe to 40.8' bgs (refusal).
## TEST BORING LOG

**GZA**  
**GeoEnvironmental, Inc.**  
**Engineers and Scientists**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Casing Blows/ Core Rate</th>
<th>Sample</th>
<th>Sample Description and Identification (Modified Burmister Procedure)</th>
<th>Remark</th>
<th>Field Test Data</th>
<th>Stratum Description Elev. (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
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<td>60</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Groundwater Depth (ft.)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Depth</th>
<th>Stab. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/13/16</td>
<td>0754</td>
<td>20.1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Ground Surface Elev. (ft.):** Groundwater Depth (ft.)

**Ground Surface Elev. (ft.):** 49.5

**Final Boring Depth (ft.):** 40.8

**Date Start - Finish:** 6/13/2016 - 6/13/2016

**Boring Location (N,E):** See Plan

**H. Datum:** NAVD 88

**V. Datum:** NAVD 88

**Exploration No.:** GZ-1

---

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Logs:**

- **Ground Surface Elev. (ft.):** 49.5
- **Final Boring Depth (ft.):** 40.8
- **Date Start - Finish:** 6/13/2016 - 6/13/2016

**Remarks:** End of exploration at 40.8 feet.
**Field Test Data** indicates field screening of head space samples for volatile organic vapors with a photoionization detector (PID) equipped with a 10.6 eV lamp. Background reading of PID was 5.0 ppm.

2. Water level measured immediately after casing and probes were removed from borehole.

3. $T_{raw}$ is measured torque from field; $S_u$ is correlated undrained shear strength. Higher and lower $T_{raw}$ and $S_u$ values correspond to peak and remolded values, respectively.

4. Advanced rod probe to 49.6' bgs (refusal).

---

### Groundwater Depth (ft.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Depth</th>
<th>Stab. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/13/16</td>
<td>0918</td>
<td>8.5</td>
<td>0</td>
</tr>
</tbody>
</table>

### Sample Description and Identification

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample Type</th>
<th>Undrained Shear Strength, $S_u$ (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 2.0</td>
<td>Top 5&quot;: Topsoil and root matter. Bottom 12&quot;: Medium stiff, gray, Silty CLAY, trace fine Sand, traces of roots, dry. (CL)</td>
<td>0.25 ksf</td>
</tr>
<tr>
<td>5.0 - 7.0</td>
<td>Soft, gray, Silty CLAY, wet. (CL)</td>
<td>Pocket Penetrometer Undrained Shear Strength, $S_u = 0.25$ ksf</td>
</tr>
<tr>
<td>10.0 - 12.0</td>
<td>Soft, olive, Silty CLAY, wet. (CL)</td>
<td>435/55 psf</td>
</tr>
<tr>
<td>12.0 - 14.0</td>
<td>Soft, olive, Silty CLAY, wet. (CL)</td>
<td>410/55 psf</td>
</tr>
<tr>
<td>14.0 - 16.0</td>
<td>Field Vane, $T_{raw} = 40/5$ ft. lbs.; Undrained Shear Strength, $S_u = 435/55$ psf</td>
<td></td>
</tr>
<tr>
<td>16.0 - 18.0</td>
<td>Field Vane, $T_{raw} = 38/5$ ft. lbs.; $S_u = 410/55$ psf</td>
<td></td>
</tr>
<tr>
<td>20.0 - 22.0</td>
<td>Soft, olive, Silty CLAY, wet. (CL)</td>
<td></td>
</tr>
<tr>
<td>24.0 - 26.0</td>
<td>Soft, olive, Silty CLAY, wet. (CL)</td>
<td></td>
</tr>
<tr>
<td>26.0 - 28.0</td>
<td>Field Vane, $T_{raw} = 34/4$ ft. lbs.; $S_u = 370/45$ psf</td>
<td></td>
</tr>
<tr>
<td>30.0 - 32.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

1. See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Casing Blows/ Core Rate</th>
<th>Sample</th>
<th>Depth (ft)</th>
<th>Pen. (in.)</th>
<th>Rec. (in.)</th>
<th>Blows (per 6 in.)</th>
<th>SPT Value</th>
<th>Sample Description and Identification (Modified Burmister Procedure)</th>
<th>Remark</th>
<th>Field Test Data</th>
<th>Stratum Description Elev. (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**REMARKS**

End of exploration at 49.6 feet.

**MARINE DEPOSITS**

**Exploration No.:**

GZ-2

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.
TEST BORING LOG

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Blows/Rec. Rate</th>
<th>Sample Description and Identification (Modified Burmister Procedure)</th>
<th>Depth (ft)</th>
<th>Field Test Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-2.0</td>
<td>24/16</td>
<td>S1: Top 4&quot;: Topsoil. Bottom 12&quot;: Loose, brown, fine to coarse SAND, little Silt, trace gravel, trace root fibers, wet. (SM)</td>
<td>0.4</td>
<td>7.1 ppm</td>
</tr>
<tr>
<td>2.0</td>
<td>24/21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>24/5</td>
<td>S2: Soft, gray, CLAY &amp; SILT, little Sand, wet. (CL)</td>
<td>5</td>
<td>6.9 ppm</td>
</tr>
<tr>
<td>7.0</td>
<td>24/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>24/21</td>
<td>S3: Medium stiff, gray, SILT &amp; CLAY, little fine Sand, with</td>
<td>10</td>
<td>9.4 ppm</td>
</tr>
<tr>
<td>10.0-12.0</td>
<td>24/21</td>
<td>organics, trace fibers and wood, wet. (ML)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td>11.3 ppm</td>
</tr>
<tr>
<td>15</td>
<td>24</td>
<td>S4: Soft to medium stiff, gray, Silty CLAY, wet. (CL)</td>
<td>15</td>
<td>12.5 ppm</td>
</tr>
<tr>
<td>15.0-17.0</td>
<td>WOR</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>17.0</td>
<td>WOR</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>20</td>
<td>24</td>
<td></td>
<td>27.4</td>
<td>6.1 ppm</td>
</tr>
<tr>
<td>20.0-24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.0</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>22.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.0-21.0</td>
<td>7</td>
<td>V1: Field Vane, T_{raw} = 45/9 ft. lbs.; Undrained Shear Strength, S_u = 500/100 psf</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>21.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V2</td>
<td></td>
<td>V2: Field Vane, T_{raw} = 45/10 ft. lbs.; S_u = 490/110 psf</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>21.4-22.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of exploration at 27.4 feet.

1 - Field test data indicates field screening of head space samples for volatile organic vapors with a photoionization detector (PID) equipped with a 10.6 eV lamp. Background reading of PID was 5.0 ppm.
2 - Water level measured immediately after casing and rod probes were removed from borehole.
3 - T_{raw} is measured torque from field; S_u is correlated undrained shear strength. Higher and lower T_{raw} and S_u values correspond to peak and remolded values, respectively.
4 - Advanced rod probe to 27.4' bgs (refusal).

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

EXPLORATION NO.: GZ-4

GZA TEMPLATE TEST BORING; 7/7/16; 5:55:31 PM
**TEST BORING LOG**

**GZA GeoEnvironmental, Inc.**

**Long Creek Watershed Management District**

**Long Creek Slope Stability**

**South Portland, Maine**

**EXPLORATION NO.: GZ-5**

**SHEET: 1 of 3**

**PROJECT NO: 09.0025909.00**

**REVIEWED BY: C. Snow**

---

**Logged By:** N. Williams

**Drilling Co.:** New England Test Boring

**Foreman:** M. Nadeau

**Type of Rig:** ATV

**Rig Model:** Dietrich D-50

**Drilling Method:** HSA

**Boring Location (N,E):** See Plan

**Ground Surface Elev. (ft.):** 50.5

**Final Boring Depth (ft.):** 66.8

**Date Start - Finish:** 6/13/2016 - 6/13/2016

**H. Datum:** NAVD 88

**V. Datum:** NAVD 88

---

**Hammer Type:** Automatic Hammer

**Hammer Weight (lb.):** 140

**Hammer Fall (in.):** 30

**Auger or Casing O.D./I.D Dia (in.):**

---

**Sample**

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>No.</th>
<th>Depth (ft.)</th>
<th>Pen. (in)</th>
<th>Rec. (in)</th>
<th>Blows (per 6 in.)</th>
<th>SPT Value</th>
<th>SPT Value</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-2.0</td>
<td>S1</td>
<td>24</td>
<td>20</td>
<td>11</td>
<td>2 3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S1: Top 6&quot;: Topsoil. Bottom 14&quot;: Soft, gray and light brown, CLAY &amp; SILT, trace fine Sand, traces of roots, dry. (CL)</td>
<td></td>
</tr>
<tr>
<td>5.0-7.0</td>
<td>S2</td>
<td>24</td>
<td>18</td>
<td>4 4</td>
<td>3 3</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S2: Very stiff, gray with light brown streaks, Silty CAY, trace fine Sand, traces of roots. (CL) Pocket Penetrometer Undrained Shear Strength, S_u = 2.25 ksf</td>
<td></td>
</tr>
<tr>
<td>10.0-12.0</td>
<td>S3</td>
<td>24</td>
<td>22</td>
<td>3 2</td>
<td>3 3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S3: Stiff, olive, Silty CLAY, trace fine Sand, wet at 10.5' bgs. (CL) Pocket Penetrometer S_u = 1.25 ksf</td>
<td></td>
</tr>
<tr>
<td>15.0-17.0</td>
<td>S4</td>
<td>24</td>
<td>24</td>
<td>11</td>
<td>1 1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S4: Top 4&quot;: Medium stiff, olive, Silty CLAY, trace fine Sand. (CL) Bottom 20&quot;: Soft to medium stiff, gray, Silty CLAY, little fine Sand, wet. (CL)</td>
<td></td>
</tr>
<tr>
<td>20.0-22.0</td>
<td>S5</td>
<td>24</td>
<td>24</td>
<td>WOH</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S5: Soft, olive, Silty CLAY, wet. (CL)</td>
<td></td>
</tr>
<tr>
<td>25.0-26.0</td>
<td>S6</td>
<td>24</td>
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<td></td>
<td>V1</td>
<td>27.0</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V2</td>
<td>25.4</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Sample Description and Identification** (Modified Burmister Procedure)

**Final Boring Depth (ft.):**

**Water Depth:**

**Stab. Time:**

---

**Groundwater Depth (ft.):**

1. Field test data indicates field screening of head space samples for volatile organic vapors with a photoionization detector (PID) equipped with a 10.6 eV lamp. Background reading of PID was 5.0 ppm.
2. Sample went from "dry" to "wet" at 10.5' bgs.
3. T_raw is measured torque from field; S_u is correlated undrained shear strength. Higher and lower T_raw and S_u values correspond to peak and remolded values, respectively.
4. Advanced rod probe to 66.8' bgs (refusal).

---

**Remarks:**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.: GZ-5**

---

**GZA TEMPLATE TEST BORING; 7/7/2016; 5:55:31 PM**
TEST BORING LOG

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Casing Blows/ Core Rate</th>
<th>Sample</th>
<th>Sample Description and Identification (Modified Burmister Procedure)</th>
<th>Remark</th>
<th>Field Test Data</th>
<th>Stratum Description Elev. (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
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<td>40</td>
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<td>45</td>
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<td>50</td>
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<td>60</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

HAMMER AND CASING INFORMATION
- Hammer Type: Automatic Hammer
- Hammer Weight (lb.): 140
- Hammer Fall (in.): 30
- Auger or Casing O.D./I.D Dia (in.): 30

SAMPLER INFORMATION
- Sampler Type: SS
- Sampler O.D. (in.): 2.0
- Sampler Length (in.): 24
- Rock Core Size: -

EXPLORATION NO.: GZ-5
PROJECT NO: 09.0025909.00
REVIEWED BY: C. Snow

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-5
**TEST BORING LOG**

**GZA**
**GeoEnvironmental, Inc.**
**Engineering and Scientists**

**EXPLORATION NO.:** GZ-5  
**PROJECT NO.:** 09.0025909.00  
**REVIEWED BY:** C. Snow

**Logged By:** N. Williams  
**Drilling Co.:** New England Test Boring  
**Foreman:** M. Nadeau

**Type of Rig:** ATV  
**Rig Model:** Dietrich D-50  
**Drilling Method:** HSA

**Boring Location (N,E):** See Plan  
**Ground Surface Elev. (ft.):** 50.5  
**Final Boring Depth (ft.):** 66.8  
**Date Start - Finish:** 6/13/2016 - 6/13/2016

**H. Datum:** NAVD 88  
**V. Datum:** NAVD 88

**Hammer Type:** Automatic Hammer  
**Hammer Weight (lb.):** 140  
**Hammer Fall (in.):** 30  
**Auger or Casing O.D./I.D Dia (in.):**

**Sampler Type:** SS  
**Sampler O.D. (in.):** 2.0  
**Sampler Length (in.):** 24  
**Rock Core Size:** -

**DEPTH (ft.)** | **Casing Blows/ Core Rate** | **Sample** | **Sample Description and Identification (Modified Burmister Procedure)** | **Remark** | **Field Test Data** | **Stratum Description Elev. (ft.)**
---|---|---|---|---|---|---
65 | | | | | | 
70 | | | | | | 
85 | | | | | | 
90 | | | | | | 

**Groundwater Depth (ft.):**
| Date | Time | Water Depth | Stab. Time |
---|---|---|---|

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:** GZ-5
**TEST BORING LOG**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Hammer Type</th>
<th>Casing Fall (in.)</th>
<th>Auger or Casing O.D./I.D Dia (in.)</th>
<th>Blows/ Core Rate</th>
<th>Sample No.</th>
<th>Depth (ft.)</th>
<th>Pen. (in.)</th>
<th>Rec. (in.)</th>
<th>Blows (per 6 in.)</th>
<th>SPT Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-2.0</td>
<td>Automatic Hammer</td>
<td>30</td>
<td>4.5/4.0&quot;</td>
<td>14</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>S1: Top 8&quot;: Topsoil. Bottom 6&quot;: Medium stiff, gray and light brown, CLAY &amp; SILT, trace fine to medium Sand, traces of roots, dry. (CL)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S2: Stiff, gray and light brown, Silty CLAY, trace fine Sand, &lt;1/4&quot; Sand seam at 6.0' bgs, dry. (CL)</td>
<td>4 3</td>
<td>1 1</td>
<td>8</td>
<td>Pocket Penetrometer Undrained Shear Strength, $S_u = 1.4$ ksf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S3: Soft to medium stiff, olive, Silty CLAY, wet. (CL)</td>
<td>24</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S4: Soft, gray, Silty CLAY, wet. (CL)</td>
<td>24</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V1: Field Vane, $T_{raw} = 40/7$ ft. lbs.; Undrained Shear Strength, $S_u = 435/75$ psf</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V2: Field Vane, $T_{raw} = 40/5$ ft. lbs.; $S_u = 435/55$ psf</td>
<td>24</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S5: Soft, gray, Silty CLAY, wet. (CL)</td>
<td>24</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

**Remarks:**
1. Field test data indicates field screening of head space samples for volatile organic vapors with a photoionization detector (PID) equipped with a 10.6 eV lamp. Background reading of PID was 5.0 ppm.
2. Water level measured immediately after casing and rod probes were removed from borehole.
3. $T_{raw}$ is measured torque from field; $S_u$ is correlated undrained shear strength. Higher and lower $T_{raw}$ and $S_u$ values correspond to peak and remolded values, respectively.
4. Advanced rod probe to 43.7’ bgs (refusal).

**Groundwater Depth (ft.)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Depth</th>
<th>Stab. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/13/16</td>
<td>1600</td>
<td>10.0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Ground Surface Elev. (ft.):** 35.0
**Boring Location (N,E):** See Plan
**Type of Rig:** ATV
**Rig Model:** Dietrich D-50
**Drilling Method:** HSA & Drive & Wash

**Exploration No.:** GZ-6

---

**See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.**
## TEST BORING LOG

**GZA GeoEnvironmental, Inc.**  
Engineers and Scientists  
GZA

### EXPLORATION NO.:  GZ-6

**Long Creek Watershed Management District**  
Long Creek Slope Stability  
South Portland, Maine

**REVIEWED BY:** C. Snow

**Logged By:** N. Williams  
**Drilling Co.:** New England Test Boring  
**Foreman:** M. Nadeau

**Type of Rig:** ATV  
**Rig Model:** Dietrich D-50  
**Drilling Method:** HSA & Drive & Wash  
**Boring Location (N,E):** See Plan  
**Ground Surface Elev. (ft.):** 35.0  
**Final Boring Depth (ft.):** 43.7  
**Date Start - Finish:** 6/13/2016 - 6/13/2016  
**H. Datum:** NAVD 88  
**V. Datum:** NAVD 88

**Hammer Type:** Automatic Hammer  
**Hammer Weight (lb.):** 140  
**Hammer Fall (in.):** 30  
**Auger or Casing O.D./I.D Dia (in.):** 4.5/4.0"

**Sampler Type:** SS  
**Sampler O.D. (in.):** 2.0  
**Sampler Length (in.):** 24  
**Rock Core Size:** -

**Groundwater Depth (ft.)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Depth</th>
<th>Stab. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/13/16</td>
<td>1600</td>
<td>10.0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Casing Blows/ Core Rate</th>
<th>Sample</th>
<th>Sample Description and Identification (Modified Burmister Procedure)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Depth (ft.)</td>
<td>Pen. (in.)</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td></td>
<td></td>
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<td>45</td>
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<td>60</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

Marine Deposits

End of exploration at 43.7 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.
## TEST BORING LOG

**GZA GeoEnvironmental, Inc.**  
**Engineers and Scientists**

**Long Creek Watershed Management District**  
**Long Creek Slope Stability**  
**South Portland, Maine**

<table>
<thead>
<tr>
<th>EXPLORATION NO.:</th>
<th>GZ-7</th>
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<tbody>
<tr>
<td>SHEET:</td>
<td>1 of 1</td>
</tr>
<tr>
<td>PROJECT NO:</td>
<td>09.0025909.00</td>
</tr>
<tr>
<td>REVIEWED BY:</td>
<td>C. Snow</td>
</tr>
</tbody>
</table>

**Logged By:** N. Williams  
**Drilling Co.:** New England Test Boring  
**Foreman:** M. Nadeau

**Type of Rig:** ATV  
**Rig Model:** Dietrich D-50  
**Drilling Method:** HSA & Drive & Wash  
**Boring Location (N,E):** See Plan  
**Ground Surface Elev. (ft.):** 39.5  
**Final Boring Depth (ft.):** 21.5  
**Date Start - Finish:** 6/13/2016 - 6/13/2016

**H. Datum:** NAVD 88  
**V. Datum:** 88

**Hammer Type:** Automatic Hammer  
**Hammer Weight (lb):** 140  
**Hammer Fall (in):** 30  
**Auger or Casing O.D./I.D Dia (in):** 4.5/4.0"

**Sample Description and Identification (Modified Burmister Procedure)**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Casing Blows/Core Rate</th>
<th>No.</th>
<th>Depth (ft)</th>
<th>Pen. (in)</th>
<th>Rec. (in)</th>
<th>Blows (per 6 in)</th>
<th>SPT Value</th>
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</thead>
<tbody>
<tr>
<td>0.0-2.0</td>
<td>24</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>2.0</td>
<td>4</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>Top 4&quot;: Topsol.</td>
<td></td>
<td>Middle 6&quot;: Medium stiff, gray to light brown, CLAY &amp; SILT, trace fine Sand, traces of roots and leaves. (CL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0-7.0</td>
<td>24</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>8</td>
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<td>7.0</td>
<td>4</td>
<td></td>
<td>4</td>
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<td></td>
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</tr>
<tr>
<td>S2</td>
<td>Stiff, gray with light brown streaks, Silty CLAY, dry. (CL)</td>
<td></td>
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<td>10.0-12.0</td>
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<td>12.0</td>
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<td></td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>S3</td>
<td>Soft to medium stiff, olive, Silty CLAY, wet. (CL)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>15.0-17.0</td>
<td>24</td>
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<td>2</td>
<td>7</td>
<td></td>
<td></td>
<td>15.1</td>
</tr>
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<td>17.0</td>
<td>9</td>
<td></td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>Medium dense, gray, fine to medium SAND, some Silt, trace Gravel. (SM)</td>
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<td></td>
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<td>92/5&quot;</td>
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<td>7.4</td>
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<td>20.9</td>
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</tr>
<tr>
<td>S5</td>
<td>Very dense, fine to coarse SAND, some Gravel. (SP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of exploration at 21.5 feet.

**Groundwater Depth (ft.)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Depth</th>
<th>Stab. Time</th>
</tr>
</thead>
</table>

**Remarks**

1. Field test data indicates field screening of head space samples for volatile organic vapors with a photoionization detector (PID) equipped with a 10.6 eV lamp. Background reading of PID was 5.0 ppm.
2. Attempted field vane at 15.1' bgs. Could not push due to gravelly resistance.
3. Refusal with SS at 20.9' bgs. Advanced roller cone to 21.5' bgs.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.
**Groundwater Depth (ft.)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Depth</th>
<th>Stab. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ground Surface Elev. (ft.):** 38.0
**Final Boring Depth (ft.):** 28.9
**Date Start - Finish:** 6/13/2016 - 6/13/2016

---

**Sample Description and Identification (Modified Burmister Procedure)**

<table>
<thead>
<tr>
<th>Depth(ft.)</th>
<th>Blows(Core Rate)</th>
<th>Hammer Type</th>
<th>Sample Type</th>
<th>Blows(per 6 in.)</th>
<th>Depth(ft.)</th>
<th>Pen.(in)</th>
<th>Rec.(in)</th>
<th>SPT Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 0.0-2.0</td>
<td>3 6</td>
<td>Automatic Hammer</td>
<td>S1: Top 4&quot;: Topsi.</td>
<td>14 5.0 ppm TOPSOIL 37.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2 5.0-7.0</td>
<td>2 2</td>
<td>Automatic Hammer</td>
<td>S2: Medium stiff to soft, gray and black, SILT &amp; CLAY,</td>
<td>4 8.4 ppm FILL 33.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S3 10.0-12.0</td>
<td>2 2</td>
<td>Automatic Hammer</td>
<td>S3: Medium stiff, gray, SILT &amp; CLAY, some</td>
<td>6 8.6 ppm CLAY FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4 15.0-17.0</td>
<td>0</td>
<td>Automatic Hammer</td>
<td>S4: Soft, gray, Silt CLAY, wet.</td>
<td>0 9.7 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5 17.0-19.0</td>
<td>0</td>
<td>Automatic Hammer</td>
<td>S5: Soft, gray, Silt CLAY, wet.</td>
<td>0 5.3 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**End of exploration at 28.9 feet.**

1 - Field test data indicates field screening of head space samples for volatile organic vapors with a photoionization detector (PID) equipped with a 10.6 eV lamp. Background reading of PID was 5.0 ppm.
2 - Advanced rod probe to refusal at 28.9' bgs. Driller noted it felt "layered" starting at 26.0' bgs.
**TEST BORING LOG**

**EXPLORATION NO.:**  GZ-HP-3  
**PROJECT NO.:**  09.0025909.00  
**REVIEWED BY:**

**Logged By:**  N. Williams  
**Drilling Co.:**  
**Foreman:**  
**Type of Rig:**  
**Rig Model:**  
**Drilling Method:**  Hand Auger  
**Boring Location (N,E):**  See Plan  
**Ground Surface Elev. (ft.):**  35.0  
**Final Boring Depth (ft.):**  5.5  
**Date Start - Finish:**  6/14/2016 - 6/14/2016  
**H. Datum:**  V. Datum:  NAVD 88

**Hammer Type:**  
**Hammer Weight (lb.):**  
**Hammer Fall (in.):**  
**Auger or Casing O.D./I.D Dia (in.):**  
**Sampler Type:**  
**Sampler O.D. (in.):**  
**Sampler Length (in.):**  
**Rock Core Size:**  

**Sample Description and Identification (Modified Burmister Procedure):**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Casing Blows/ Core Rate</th>
<th>Sample</th>
<th>Pen. (in)</th>
<th>Rec. (in)</th>
<th>Blows (per 6 in.)</th>
<th>SPT Penetration Value</th>
<th>Sample Description</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3-1.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown, medium to coarse SAND, traces of wood and root fibers, dry. (SP)</td>
<td></td>
</tr>
<tr>
<td>1.8-2.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gray and brown, CLAY &amp; SILT, some fine Sand, traces of wood and root fibers. (CL)</td>
<td></td>
</tr>
<tr>
<td>2.6-5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gray, SILT and fine Sand, dry. (ML)</td>
<td>1</td>
</tr>
<tr>
<td>5.0-5.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gray, Silty CLAY, trace fine Sand, dry. (CL)</td>
<td></td>
</tr>
</tbody>
</table>

**Groundwater Depth (ft.)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Depth</th>
<th>Stab. Time</th>
</tr>
</thead>
</table>

**Remarks:**

- Hand-augered to 5.0' bgs. Attempted field vane at 5.0' but could not push field vane. Advanced pointed hand probe 5.0' bgs to 5.5' bgs and could not advance deeper.

---

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.
See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.
Appendix C – Stability Section Locations and Results
NOTE: BACKGROUND INFORMATION FOR PLAN WAS PROVIDED BY LCWMD IN A DRAWING LABELED "BORINGS_EXHIBITS_4-5-16.DWG" ON JUNE 16, 2016. APPROXIMATE AS DRILLED BORING LOCATIONS AND GLOBAL STABILITY CROSS-SECTIONS WERE ADDED BY GZA.
Location: Section 1-1
Created By: Nicholas Williams
Project: LCWMD Geotech Exploration and Evaluation
Job #: 09.0025909.00

Name: Fill Unit Weight: 110 pcf Cohesion': 0 psf Phi': 32°
Name: Stiff Clay (Marine Deposit) Unit Weight: 115 pcf Cohesion': 1,100 psf Phi': 0°
Name: Soft Clay (Marine Deposit) Unit Weight: 115 pcf Cohesion': 425 psf Phi': 0°
Name: Excavated Fill Unit Weight: 1 pcf Cohesion': 0 psf Phi': 1°

Note: Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.
NOTE: BACKGROUND INFORMATION FOR PLAN WAS PROVIDED BY LCWM IN A DRAWING LABELED "BORINGS_EXHIBITS_4-5-16.DWG" ON JUNE 16, 2016. APPROXIMATE AS DRILLED BORING LOCATIONS AND GLOBAL STABILITY CROSS-SECTIONS WERE ADDED BY GZA.
Location: Section 2-2
Created By: Nicholas Williams
Project: LCWMD Geotech Exploration and Evaluation
Job #: 09.0025909.00

Name: Fill
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 32 °

Name: Soft Clay (Marine Deposit)
Unit Weight: 115 pcf
Cohesion': 425 psf
Phi': 0 °

Name: Stiff Clay (Marine Deposit)
Unit Weight: 115 pcf
Cohesion': 800 psf
Phi': 0 °

Name: Excavated Fill
Unit Weight: 0.1 pcf
Cohesion': 0 psf
Phi': 0.1 °

Note: Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.
NOTE: BACKGROUND INFORMATION FOR PLAN WAS PROVIDED BY LCWMD IN A DRAWING LABELED "BORINGS_EXHIBITS_4-5-16.DWG" ON JUNE 16, 2016. APPROXIMATE AS DRILLED BORING LOCATIONS AND GLOBAL STABILITY CROSS-SECTIONS WERE ADDED BY GZA.
Location: Section 3-3
Created By: Nicholas Williams
Project: LCWMD Geotech Exploration and Evaluation
Job #: 09.0025909.00

Name: Fill
   Unit Weight: 110 pcf
   Cohesion: 0 psf
   Phi: 32°

Name: Excavated Fill
   Unit Weight: 0.1 pcf
   Cohesion: 0 psf
   Phi: 0.1°

Name: Stiff Clay (Marine Deposit)
   Unit Weight: 115 pcf
   Cohesion: 800 psf
   Phi: 0°

Name: Soft Clay (Marine Deposit)
   Unit Weight: 115 pcf
   Cohesion: 425 psf
   Phi: 0°

Note: Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.
Name: Fill  Unit Weight: 110 pcf  Cohesion: 0 psf  Phi: 32 °
Name: Excavated Fill  Unit Weight: 0.1 pcf  Cohesion: 0 psf  Phi: 0.1 °
Name: Stiff Clay (Marine Deposit)  Unit Weight: 115 pcf  Cohesion: 800 psf  Phi: 0 °
Name: Soft Clay (Marine Deposit)  Unit Weight: 115 pcf  Cohesion: 425 psf  Phi: 0 °

Note: Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.
<table>
<thead>
<tr>
<th>Name</th>
<th>Unit Weight</th>
<th>Cohesion</th>
<th>Phi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill</td>
<td>110 pcf</td>
<td>0 psf</td>
<td>32°</td>
</tr>
<tr>
<td>Excavated Material</td>
<td>0.1 pcf</td>
<td>0 psf</td>
<td>0.1°</td>
</tr>
<tr>
<td>Stiff Clay (Marine Deposit)</td>
<td>115 pcf</td>
<td>1,100 psf</td>
<td>0°</td>
</tr>
<tr>
<td>Soft Clay (Marine Deposit)</td>
<td>115 pcf</td>
<td>425 psf</td>
<td>0°</td>
</tr>
</tbody>
</table>

Note: Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.

Location: Section 8-8
Created By: Nicholas Williams
Project: LCWMD Geotech Exploration and Evaluation
Job #: 09.0025909.00
NOTE: BACKGROUND INFORMATION FOR PLAN WAS PROVIDED BY LCWMD IN A DRAWING LABELED "BORINGS_EXHIBITS_4-5-16.DWG" ON JUNE 16, 2016. APPROXIMATE AS DRILLED BORING LOCATIONS AND GLOBAL STABILITY CROSS-SECTIONS WERE ADDED BY GZA.

GZ-5

GZA
GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

LONG CREEK WATERSHED
MANAGEMENT DISTRICT
35 MAIN STREET, SUITE 3
WINDHAM, MAINE 04062

JULY, 2016

© 2018 GZA GeoEnvironmental, Inc.
Location: Section 5-5
Created By: Nicholas Williams
Project: LCWMD Geotech Exploration and Evaluation
Job #: 09.0025909.00

Name: Fill  Unit Weight: 110pcf  Cohesion': 0 psf  Phi': 32°
Name: Excavated Fill  Unit Weight: 0.1pcf  Cohesion': 0 psf  Phi': 0.1°
Name: Stiff Clay (Marine Deposit)  Unit Weight: 115pcf  Cohesion': 1,100 psf  Phi': 0°
Name: Soft Clay (Marine Deposit)  Unit Weight: 115pcf  Cohesion': 425 psf  Phi': 0°

Note: Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.
NOTE: BACKGROUND INFORMATION FOR PLAN WAS PROVIDED BY LCWMD IN A DRAWING LABELED "BORINGS.EXHIBITS.4-5-16.DWG" ON JUNE 16, 2016. APPROXIMATE AS DRILLED BORING LOCATIONS AND GLOBAL STABILITY CROSS-SECTIONS WERE ADDED BY GZA.
\begin{itemize}
\item \textbf{Name:} Fill  \hspace{1cm} \textbf{Unit Weight:} 110 pcf  \hspace{1cm} \textbf{Cohesion':} 0 psf  \hspace{1cm} \textbf{Phi':} 32 °
\item \textbf{Name:} Excavated Fill  \hspace{1cm} \textbf{Unit Weight:} 0.1 pcf  \hspace{1cm} \textbf{Cohesion':} 0 psf  \hspace{1cm} \textbf{Phi':} 0.1 °
\item \textbf{Name:} Stiff Clay (Marine Deposit)  \hspace{1cm} \textbf{Unit Weight:} 115 pcf  \hspace{1cm} \textbf{Cohesion':} 1,100 psf  \hspace{1cm} \textbf{Phi':} 0 °
\item \textbf{Name:} Soft Clay (Marine Deposit)  \hspace{1cm} \textbf{Unit Weight:} 115 pcf  \hspace{1cm} \textbf{Cohesion':} 425 psf  \hspace{1cm} \textbf{Phi':} 0 °
\end{itemize}

\textbf{Location:} Section 6-6  \\
\textbf{Created By:} Nicholas Williams  \\
\textbf{Project:} LCWMD Geotech Exploration and Evaluation  \\
\textbf{Job #:} 09.0025909.00

\textbf{Note:} Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.
NOTE: BACKGROUND INFORMATION FOR PLAN WAS PROVIDED BY LCWM IN A DRAWING LABELED "BORINGS_EXHIBITS_4-5-16.DWG" ON JUNE 16, 2016. APPROXIMATE AS DRILLED BORING LOCATIONS AND GLOBAL STABILITY CROSS-SECTIONS WERE ADDED BY GZA.

DEAD RIVER ATLANTIC PLACE LLC
311 DARLING AVENUE
TM 67 LOT 9

GZA
GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com
Location: Section 7-7
Created By: Nicholas Williams
Project: LCWMD Geotech Exploration and Evaluation
Job #: 09.0025909.00

Name: Fill
Unit Weight: 110 pcf
Cohesion': 0 psf
Phi': 32 °

Name: Excavated Fill
Unit Weight: 0.1 pcf
Cohesion': 0 psf
Phi': 0.1 °

Name: Stiff Clay (Marine Deposit)
Unit Weight: 115 pcf
Cohesion': 1,100 psf
Phi': 0 °

Name: Soft Clay (Marine Deposit)
Unit Weight: 115 pcf
Cohesion': 425 psf
Phi': 0 °

Name: Sand
Unit Weight: 125 pcf
Cohesion': 0 psf
Phi': 38 °

Note: Elevation is in reference to the contours in the file "borings.dwg" provided by LCWMD. The Distance (ft) is in reference to the cross section, 0 is the start of the cross section shown in the boring layout.
Elevation vs. Peak Undrained Shear Strength

- Stiff Clay = 1100 psf
- Medium Stiff Clay = 800 psf
- Soft Clay = 425 psf
APPENDIX C

LONG CREEK MAIN STEM RESTORATION PROJECT, INVASIVE PLANT SPECIES CONTROL AND REPLANTING PLAN (DECEMBER 2018)
Revised Final Submittal

Long Creek Main Stem Restoration Project
Invasive Plant Species Control and Replanting Plan

Prepared for:

Long Creek Watershed Management District
35 Main Street, Suite 3
Windham, Maine 04062

December 2018

 Prepared by:

GZA GeoEnvironmental, Inc.

477 Congress Street, Suite 700  |  Portland, Maine 04101
207-879-9190

27 Offices Nationwide
www.gza.com

In Association with:
INVASIVE PLANT SPECIES CONTROL AND REPLANTING PLAN

This invasive plant species control and replanting plan (Plan) has been developed to support the restoration design for the section of the Main Stem of Long Creek situated between Maine Mall Road to the northwest and Foden Road to the southeast. The purpose of this Plan is to summarize the pre-construction vegetative cover, identify the proposed restoration activities and their potential impact on the vegetative cover, and identify management practices for the areas of invasive species within the proposed restoration work areas.

1.0 Existing Conditions and Vegetative Cover

GZA GeoEnvironmental, Inc. (GZA) completed a pre-construction site visit on December 22, 2017 to identify and map the invasive plant species within the project area and proposed restoration work areas based on the 30% design submitted by St.Germain Collins in December 2017.

The proposed restoration work areas include at least three primary types of plant species that have been identified by the Maine Department of Agriculture, Conservation, and Forestry as invasive in Maine:

- Japanese Knotweed (*Fallopia japonica*) and/or Giant Knotweed (*Fallopia sachalinensis*)
- Common Reed or Phragmites (*Phragmites australis*)
- Multiflora Rose (*Rosa multiflora*)

Additionally, purple loosestrife (*Lythrum salicaria*) is present in moist to wet areas throughout the watershed and is present in small quantities within sunny areas of the floodplain. At the time of the 30% design submittal and subsequent invasive species survey, the proposed restoration areas were snow-covered, and the vegetation had become dormant making positive identification of knotweed species or low-growing herbaceous invasive plant species, such as purple loosestrife, difficult.

Figure 1 depicts the approximate extent of invasive plant species visible within the project area during our December 22, 2017 site visit.

2.0 Proposed Activities

The Long Creek Main Stem Restoration Project Basis of Design Report identifies seven restoration components within the project area:

1. Removal of fill material in areas that are intruding on the original floodplain;
2. Construction of gravel core mounds in the restored floodplain to allow the input of gravel substrate to the creek as the channel migrates across the floodplain;
3. Repair and stabilization of two areas of bank erosion that input fine sediment to the creek (i.e., 341 Park, LLC parcel [LCWMD Parcel # 62] and the Cornerbrook, LLC parcel [LCWMD Parcel #65]);
4. Installation of root wads and simulated log jams to mimic natural accumulations of wood observed in the reference reach and encourage colonization of the restored stream with macroinvertebrates;
5. Stabilization of embankments at locations of fill removal to a slope that is suitable for native soils and will support revegetation;
6. Development of a long-term invasive species control plan; and
7. Planting of native shrub and tree species in the restored floodplain to rebuild native tree canopy to further enhance microhabitat diversity and discourage recolonization of invasive plant species.
The extent invasive plant species generally align with the areas of historical fill identified by Field Geology Services during the 2014 and 2015 Lower Main Stem study. Of these historical fill areas, one is identified for removal under this restoration design.

### 3.0 Invasive Species Management Plan

#### 3.1 Targeted Invasive Plant Species

**Japanese Knotweed** (*Fallopia japonica*) and/or **Giant Knotweed** (*Fallopia sachalinensis*) are large perennial herbaceous plants that spread by both underground rhizomes and seed dispersion. An individual rhizome may spread as far as 65 feet from the parent plant and down 7 feet into the soil. Seeds are easily spread and transported both naturally and with anthropogenic assistance. This species is aggressive, spreads fast, and can easily become established in both disturbed and non-disturbed areas. Furthermore, it is tolerant of a variety of conditions including drought, flooding, salinity, shade, and temperature extremes. Knotweed is found primarily in the upper floodplain and upland portions of the restoration area. Small stands are also present on the lower floodplain on the northeastern bank of Long Creek near where historical fill is encroaching on the stream channel (Long Creek Conceptual Design Package, plate 3).

**Common Reed or Phragmites** (*Phragmites australis*) is a tall perennial grass that can grow up to 13 feet tall and form dense stands. Phragmites reproduce primarily by fragments of rhizome dispersed in fill or by water. More rarely it can spread by fertile seed. It prefers open wetlands and ditches and is tolerant to a variety of salinity and temperature conditions. Phragmites is found primarily in the moist to wet areas of the floodplain as well as in upland areas containing moist soils (such as near stormwater outfalls).

**Multiflora Rose** (*Rosa multiflora*) is a large perennial, deciduous shrub that reproduces by seed and rooting from twig tips. Birds and mammals commonly consume fruits and disperse the seed. Plants will re-sprout if cut back, and seeds are viable in soil for up to 20 years. Multiflora rose grows largest in full sun, but is somewhat shade tolerant. It is tolerant of dry to moist soils. The restoration area contains isolated patches of multiflora rose in upland areas with historical disturbance. The most visible specimens during the December 2017 site visit were located northwest of the detention basin at the Cornerbrook LLC parcel (343 Gorham Road) and northeast of the NECG Mallside BH LLC parcel (198 Maine Mall Road). Due to multiflora rose’s tolerance of a variety of soil conditions, it is possible that additional areas of multiflora rose vegetation will be encountered during restoration activities.

### 3.2 Phase I: Invasive Plant Species Management During Construction

**Year 1: Construction**

Contractor should identify patches of knotweed, phragmites, and purple loosestrife within the work areas. Contractor should hand-cut invasive vegetation prior to excavation and prior to the flowering period (typically in August). Cut material should be stockpiled for incineration. Portions of the work areas containing invasive plant species infestation should be excavated until no rhizomes are seen, as confirmed by a qualified botanist or landscaper and authorized by the Owner’s Representative, a minimum depth of 3 feet. Vegetation and rhizomes should be stockpiled for incineration. Disturbed areas should be replanted.

---

with large native shrubs and seeded with wetland or riparian scrub-shrub mix to discourage re-establishment of invasive plant species (see Section 4 below for details).

3.3 Phase II: Post-Construction Invasive Plant Species Management (Year 1)

Year 2: Manual Control

The restored areas should be monitored monthly during the growing season for evidence of reappearance of invasive plant species. Invasive plant shoots observed should be hand-dug at these times to protect these replanted areas. Should the remaining stands of knotweed or phragmites that were not included in the construction work area begin encroaching on the restoration areas, LCWMD should consider manual control options such as mowing or cutting up to a 10-foot-wide strip adjacent to the restored area. During the knotweed and phragmites flowering period (August-September), LCWMD should consider cutting or mowing and incinerating phragmites/knotweed source material that was not removed during construction.

3.4 Phase III: Long-Term Management of Invasive Plant Species

Years 3-5: Combination Control

If manual control of invasive plants is not effective (i.e., phragmites and knotweed continue to encroach in restoration areas), LCWMD should consider adding a chemical control component. The Nature Conservancy as well as conservation groups such as Hamilton County (New York) Soil and Water Conservation District have documented success with chemical injection into the canes of knotweed and limited spraying of phragmites. While the long-term goal of the restoration and replanting is to use non-chemical and low-labor intensive means (i.e., shading and plant density) to discourage recolonization of invasive plants, interim control measures may be required to give the native plantings the opportunity to mature enough to provide the shade and density as designed.

The City of South Portland maintains a Pesticide Use Ordinance which limits the chemical controls available to LCWMD. The following approaches would not require a waiver from the City of South Portland’s Pesticide Use Ordinance:

- **Manual control:** hand-removal should be continued within the restoration areas at a minimum of three (3) times per summer (late spring, mid-summer, late summer). If deemed necessary, chemical control measures described below should be used during a fourth visit during the flowering period (late summer to early fall).

- **Organic control:** The City of South Portland has a list of approved herbicides that comply with its Pesticide Use Ordinance. Only one of the chemicals listed identifies knotweed control as a possible usage; however, to date there is not much data regarding effectiveness. To comply with the City’s ordinance and make an effort to use organic control means, LCWMD could apply the sodium chloride-based herbicide “A.D.I.O.S” to cut knotweed canes in and adjacent to the restoration areas. LCWMD should consider that this is a salt-based material that could result in increased chloride concentrations in the stream over time. Additionally, knotweed is somewhat salt-tolerant, and the stands should be monitored for effectiveness of treatment.

Should the above approaches prove inadequate to address the reemergence of invasive plants, LCWMD should apply for a waiver from the City of South Portland’s Pesticide Use Ordinance. In order to apply for a waiver, LCWMD must demonstrate that the following conditions have been

met: (i) A situation exists that threatens the public health and safety and/or where invasive species pose a threat to the environment; (ii) The applicant has carefully evaluated all alternative methods and materials; (iii) The applicant will, to the greatest extent practical, minimize the impact of the application on abutting properties; and, (iv) The grant of the waiver will not be detrimental to the public health, safety or welfare.

Preliminary discussions with the City of South Portland’s Sustainability Coordinator suggest that it would be appropriate for LCWMD to apply for a waiver by using the phased approach that focuses on source material removal and manual control and only resorting to chemical control when these approaches are not adequate to manage the invasive plants. If the waiver is approved by the City of South Portland, the second portion of the combination control would consist of the following:

- **Direct chemical control:** Aquaneat is EPA-approved for use in aquatic systems and contains the active ingredient glyphosate which has been shown to be effective in controlling both knotweed and phragmites. The most effective knotweed control appears to be the direct injection of up to 5mL of glyphosate into each stem within a stand using a syringe. While very labor intensive, this minimizes the risk of “overspray” or incidental exposure of other plants or aquatic biota. Aquaneat could also be directly applied to phragmites, as needed, if mechanical means are ineffective at controlling the spread within the restoration area.

- **Broadcast chemical control:** If needed, glyphosate could be applied via broadcast spraying to control areas of phragmites if manual and direct control is not effective. If the majority of the source material is removed and manual control is consistently implemented, broadcast spraying is unlikely to be required to control phragmites during the native shrub growth period.

### 4.0 Replanting Plan

The area proposed for replanting is depicted on Figure 1 and includes one area of fill removal. Details for the replanting area are provided on Figure 2. The goal of the replanting plan is to populate the restoration area with native species following invasive plant removal and discourage re-infestation of invasive plant species. Criteria for native plant selection includes: (1) suitability for growth in the conditions within the restoration area (preference given to native species that are currently growing in this part of the watershed); (2) successful growth in other restoration areas within the watershed (i.e., Blanchette Brook restoration area); (3) growth height adequate to provide shading within the riparian corridor thereby discouraging, and resistant to being overcome by, invasive species regrowth; and, (4) hardy and relatively rapid growth rate sufficient to provide soil stabilization and reduce encroachment of invasive plant species on the restoration area.

### 4.1 Plant Species

The contractor will replant the area of disturbance depicted on Figure 2 hereafter referred to as the “replanting area”. Live plants will be installed throughout the replanting area at the densities depicted on Figure 2 (and provided in the design plans as Sheet C-106) and applying a wetland or riparian seed mix in the spaces between the plants as well as in selected areas in need of stabilization. The plant list is provided as Appendix A and the seed mix specification is included as Appendix B.

The focus of the replanting area will be installing a riparian buffer consisting of specific native tree and shrub species selected for different hydrologic regimes and different vegetative cover types throughout the replanting area. The trees and shrubs have been selected from the University of Maine Cooperative Extension’s native plants list contained in Bulletin #2500, Gardening to Conserve Maine’s Native Landscape:
Plants to Use and Plants to Avoid\(^4\) and the Maine Department of Environmental Protection’s The Buffer Handbook Plant List (Publication #DEPLW0094-B2009)\(^5\). The trees and shrubs selected for the replanting area are listed in Appendix A. The plants have been selected to mirror the site conditions (i.e., wetland plants in the re-established floodplain and riparian plants in the uplands), and, where possible, plants have been selected to augment native populations already growing near the restoration areas. Plants will be either bare root, live stake, or containerized species. Minimum sizes for each species are provided in Appendix A.

4.2 Plant Density and Placement

The replanting areas will be planted with large specimens and spaced approximately 8 feet on center for shrubs and small trees species, and 12 feet on center for large tree species. Areas between the monocultures will be planted with riparian seed mix at an application rate specified in Appendix B. Typical planting details are provided in Appendix C.

4.3 Planting Methods

Seeding will be applied, and plantings installed, according to acceptable standards of the trade under the supervision of a landscape professional with suitable practical field experience in riparian buffer installation projects. All seed and plant materials will be nursery-grown and will be guaranteed to be true to name and healthy upon delivery. During planting operations, the contractor will keep the trees and shrubs out of direct sunlight and maintain moisture on the roots to ensure that the roots do not dry out prior to planting.

An area twice the width of the root ball will be dug prior to planting trees and shrubs into the substrate at the point of installation. If the plant is in a plastic container, the container will be carefully removed to keep the root ball intact. After planting, the area will be backfilled and watered. Tree stakes may be installed if additional support is needed. Care will be taken when installing support stakes to ensure that the root ball is not disturbed when driving the support stake into the soil. Standard planting details are provided in Appendix C.

4.4 Wildlife Damage Control

Based on available wildlife range information as well as field observations, the planting area is at potential risk from damage from New England cottontail (*Sylvilagus transitionalis*) and white-tailed deer (*Odocoileus virginianus*). The primary species selected for planting are those from the alder family (*Alnus rugosa* and *Alnus serrulata*), staghorn sumac (*Rhus hirta*), and red maple (*Acer rubrum*). This plan specifies larger plant sizes in order to mitigate potential damage from wildlife. Alder are generally not targeted by white-tailed deer if other food is available; however, they may attract New England cottontail once established due to their shrubby and low-growing habit. Both sumac and maple are potential food sources for whitetail deer. Therefore, protective fencing could be installed around these monocultures if desired by LCWMD. Additionally, plant installation early in the growing season (i.e., prior to June 15th) is often helpful to resist herbivore damage by allowing the plant to become established over the growing season prior to winter grazing. If possible, early season planting should be considered by LCWMD. Chemical control (i.e., rodenticide) is not proposed under this Plan in order to be protective of the New England cottontail, a former candidate for protection under the Federal Endangered Species Act and a Maine Inland Fisheries and Wildlife Priority 1 Species of Greatest Conservation Need.

\(^4\) https://extension.umaine.edu/publications/2500e/  
\(^5\) https://www1.maine.gov/dep/land/watershed/buffplantlist.pdf
4.5 Performance Standards and Monitoring

The replanting areas shall be monitored and maintained in accordance with this Plan as well as any applicable permit conditions.

5.0 References


Long Creek Conceptual Design Package developed by Field Geology Services, dated June 15, 2015, and presented to the Long Creek Expert Review Panel Riparian Corridor subcommittee on June 25, 2015.


FIGURES

Figure 1  INVASIVES SPECIES LOCATION OVERVIEW (also provided as Sheet 105 in the Design Plans)
Figure 2  INVASIVES CONTROL PLANTING AREA (also provided on Sheet 106 in the Design Plans)
Figure 3  PLANTING DETAILS (also provided as Sheet 106 in the Design Plans)
INVASIVE PLANT SPECIES LOCATION AND CONTROL OVERVIEW

LEGEND:
- Approximate Extent of Japanese Knotweed (Fallopia japonica) and/or Giant Knotweed (Fallopia sachalinensis)
- Approximate Extent of Common Reed or Phragmites (Phragmites australis)
- Approximate Extent of Multiflora Rose (Rosa multiflora)
- Edge of Stream

Data Sources:
- Maine GeoLibrary
- MEGIS, Maine DEP
- City of Portland
- City of South Portland
- City of Westbrook
- Town of Scarborough

GZA File No.: 09.0025954.00

Drawn By: A. Mountain 12/17/2018

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1) TREES AND SHRUBS SHALL BE OF QUALITY PRESCRIBED IN SPECIFICATIONS.
2) RELATIVE POSITIONS OF ALL PLANTS AND TREES ARE SUBJECT TO APPROVAL OF THE OWNER'S REPRESENTATIVE.
3) NOTIFY THE OWNER'S REPRESENTATIVE, ONE (1) WEEK PRIOR TO LAYOUT. LAYOUT ALL INDIVIDUAL TREE AND SHRUB LOCATIONS. PLACE PLANTS ABOVE SURFACE AT PLANTING LOCATION OR PLACE A LABELED STAKE AT PLANTING LOCATION. LAYOUT BED LINES WITH PAINT FOR THE OWNER'S REPRESENTATIVE'S ACCEPTANCE BEFORE DIGGING AND START OF PLANTING WORK.
4) WHEN APPLICABLE, PLANT TREES BEFORE OTHER PLANTS ARE INSTALLED.
5) IT IS UNDERSTOOD THAT PLANTS ARE NOT PRECISE OBJECTS AND THAT MINOR ADJUSTMENTS IN THE LAYOUT WILL BE REQUIRED AS THE PLANTING PLAN IS CONSTRUCTED. THESE ADJUSTMENTS MAY NOT BE APPARENT UNTIL SOME OR ALL OF THE PLANTS ARE INSTALLED. MAKE ADJUSTMENTS AS REQUIRED BY THE OWNER'S REPRESENTATIVE INCLUDING RELOCATING PREVIOUSLY INSTALLED PLANTS.
6) SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS RELATED TO THIS DETAIL.

NOTES:

SOURCE: URBAN TREE FOUNDATION © 2014 OPEN SOURCE FREE TO USE
Appendix A – Plant List

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Number</th>
<th>Available Size</th>
<th>Specified Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Maple</td>
<td><em>Acer rubrum</em></td>
<td>5</td>
<td>5-6’</td>
<td>6-7’</td>
</tr>
<tr>
<td>Smooth alder</td>
<td><em>Alnus serrulata</em></td>
<td>18</td>
<td>not available</td>
<td>5-6’</td>
</tr>
<tr>
<td>Serviceberry</td>
<td><em>Amelanchier canadensis</em></td>
<td>20</td>
<td>3-4’</td>
<td>5-6’</td>
</tr>
<tr>
<td>Redosier dogwood</td>
<td><em>Cornus sericea</em></td>
<td>25</td>
<td>2-2.5’</td>
<td>3-5’</td>
</tr>
<tr>
<td>White Pine</td>
<td><em>Pinus strobus</em></td>
<td>5</td>
<td>8-10’</td>
<td>8-10’</td>
</tr>
<tr>
<td>Staghorn sumac</td>
<td><em>Rhus typhina</em></td>
<td>22</td>
<td>5-6’</td>
<td>8-10’</td>
</tr>
<tr>
<td>Black Willow$^3$</td>
<td><em>Salix nigra</em></td>
<td>22</td>
<td>2-2.5’</td>
<td>5-6’</td>
</tr>
</tbody>
</table>

TOTAL: 117

NOTE:
2. Size preferred in order to maximize chances of successfully managing invasive plant re-establishment using non-chemical means.
3. Black Willow (*Salix nigra*) has been selected for planting adjacent to the gravel mounds (see Sheets 101 through 104 in the Design Plans).
Appendix B – Seed Mix Requirements

B.1 Wetland Seed Mix

Description

The wetland seed mix should be equivalent to New England Wetland Plants, Inc. New England Wetmix (Wetland Seed Mix). This mix contains a wide variety of native seeds that are suitable for most wetland restoration sites that are not permanently flooded. All species are best suited to moist ground as found in most wet meadows, scrub shrub, or forested wetland restoration areas. The mix is well suited for detention basin borders and the bottom of detention basins not generally under standing water. The seeds will not germinate under inundated conditions. If planted during the fall months the seed mix will germinate the following spring. During the first season of growth several species will produce seeds while other species will produce seeds after the second growing season. Not all species will grow in all wetland situations. This mix is comprised of the wetland species most likely to grow in created/restored wetlands and should produce more than 75% ground cover in two full growing seasons.

The wetland seeds in this mix can be sown by hand, with a hand-held spreader, or hydro-seeded on large or hard to reach sites. Lightly rake to insure good seed-to-soil contact. Seeding can take place on frozen soil, as the freezing and thawing weather of late fall and late winter will work the seed into the soil. If spring conditions are drier than usual watering may be required. If sowing during the summer months supplemental watering will likely be required until germination. A light mulch of clean, weed free straw is recommended.

Application rate

18 pounds per acre or one pound per 2,500 square feet

Seed Mix Composition

B.2 Riparian Seed Mix

Description

The riparian seed mix should be equivalent to New England Wetland Plants, Inc. New England Roadside Matrix Wet Meadow Seed Mix (Riparian Seed Mix). This mix contains native grasses, wildflowers, and shrubs that are blended together as a native matrix seed mix. In areas that receive frequent mowing, the cold season grasses will dominate, such as those areas closest to the roadway shoulder. In areas farther from the road, which may be mowed only once each year, or in hard to mow areas, such as around sign posts, the wildflower component will become dominant. Along cuts and side slopes which may never be mowed, the shrub component will add diversity and beauty to the roadside plantings. It is a particularly appropriate seed mix for roadsides, industrial sites, or cut and fill slopes.

This mix may be applied by hydroseeding, or by mechanical spreader. Always apply on a clean, weed-free seed bed. After sowing, lightly rake or roll the site to improve seed-to-soil contact. Best results are obtained with a mid-late spring seeding. Summer seeding will benefit from a light mulching of clean, weed-free straw to conserve soil moisture and supplemental watering will likely be required until germination.

Application rate

18 pounds per acre or one pound per 2,500 square feet

Seed Mix Composition

Grasses

Wildflowers
Blue Vervain (*Verbena hastata*), Nodding Bur Marigold (*Bidens cernua*), Spotted Joe Pye Weed (*Eupatorium maculatum*), Zigzag Aster (*Aster prenanthoides*/Symphyotrichum prenanthoides), Hollow-Stem Joe Pye Weed (*Eupatorium fistulosum*/Eutrochium fistulosum)

Shrubs
Elderberry (*Sambucus canadensis*), Silky Dogwood (*Cornus amomum*), Arrow Wood (*Viburnum dentatum*)
Camouflage and improvements in its use

This section discusses the effectiveness of camouflage and its use in various contexts. It highlights the importance of blending in and avoiding detection, particularly in military and security applications. The text delves into the history of camouflage, its evolution, and the strategies employed to improve its effectiveness. It also examines the psychological aspects that influence the perception of camouflage and how it can be used strategically.

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Legend:
- Approximate Extent of Japanese Knotweed (Fallopia japonica) and/or Giant Knotweed (Fallopia sachalinensis)
- Approximate Extent of Common Reed or Phragmites (Phragmites australis)
- Approximate Extent of Multiflora Rose (Rosa multiflora)
- Planting Area (See Sheet C-106 for Planting Area Details)
- Edge of Stream

Note:
1. Location and extent of invasive species were mapped by GZA in December 2017 using a hand-held GPS unit that has a horizontal accuracy of approximately three meters. Location and extent should be considered approximate as current conditions may vary.
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SOURCE: URBAN TREE FOUNDATION © 2014 OPEN SOURCE FREE TO USE

Legend:
- Redosier Dogwood (Cornus sericea) (25)
- Staghorn Sumac (Rhus typhina) (22)
- Smooth Alder (Alnus serrulata) (18)
- Serviceberry (Amelanchier canadensis) (20)
- Red Maple (Acer rubrum) (5)
- White Pine (Pinus strobus) (5)

PLANTING PLAN AND DETAILS
LONG CREEK MAIN STEM RESTORATION

GZA File No.: 09.0025954.00

NOT TO SCALE

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- White Pine (Pinus strobus) (5)
B. EROSION AND SEDIMENT CONTROL MEASURES

7. TEMPORARY SEEDING SPECIFICATIONS. WHERE THE SEED BED HAS BEEN COMPACTED BY

6.

A. GENERAL

3. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND

D.

B.

E. RIP RAP REQUIRED AT CULVERTS AND STORM DRAIN INLETS AND OUTLETS SHALL CONSIST

C.

A. USE CRUSHED STONE OR ACCEPTABLE ON-SITE MATERIAL. (STONE AGGREGATE SIZE - 2"-

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- 3" GRAVEL OR FINGERRock), GRAVEL BORROW OR OTHER ACCEPTABLE MATERIAL.

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- 3" GRAVEL OR FINGERRock), GRAVEL BORROW OR OTHER ACCEPTABLE MATERIAL.
Wood shall resist the expected forces associated with high flows and buoyancy as determined by the overseeing engineer, fluvial geomorphologist. Wood installed as part of restoration is not intended to be mobile. Installed rootwads must be cabled or otherwise anchored to the satisfaction of the overseeing engineer.