PROJECT MANUAL

for

BROWN BRIDGE DAM REMOVAL AND RESTORATION

BOARDMAN RIVER
GRAND TRAVERSE COUNTY, MICHIGAN

MAY 10, 2012

Prepared for:
Boardman River Dams Settlement Agreement Implementation Team
Grand Traverse County, Michigan

Prepared by:
AMEC Environment and Infrastructure, Inc.
and
Inter-Fluve, Inc.
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BIDDING REQUIREMENTS
Sealed bids for **BROWN BRIDGE DAM REMOVAL AND RESTORATION** are solicited as described below:

**WORK DESCRIPTION:**

The work to be completed consists of two major components:

2. Restoration of the Boardman River for approximately 13,300 linear feet through and upstream of the Brown Bridge Dam.

**OWNER:** Boardman River Dams Settlement Agreement Implementation Team  
Grand Traverse County, Michigan

**PROPERTY OWNER:** City of Traverse City, Michigan

**ENGINEER:**  
AMEC Environment & Infrastructure, Inc. (AMEC)  
41 Hughes Drive  
Traverse City, Michigan 49696  
Attention: Ms. Sandra Sroonian, Senior Principal Engineer  
E-mail: sandra.sroonian@amec.com  
Office Phone: (231) 922-9050, ext. 201 or Scott Rought at ext. 212

**RECEIPT OF BIDS:**

Bids (including the completed Bid Form, Bid Schedule, and all other required documents) must be received at the office of AMEC at the above listed address, to the attention of Mr. Scott Rought, on or before 5:00 PM EDT on June 1, 2012. Ten (10) complete hard copies of Bids (each with original signatures) and one (1) electronic copy of the Bid on CD shall be submitted.

**AVAILABILITY OF DOCUMENTS:**

One electronic copy of the Request for Proposal (RFP), hereinafter also termed the Bidding Documents (consisting of the Project Manual and Drawings), will be provided to each potential Bidder. Copies of reports and drawings of site subsurface and physical conditions will also be provided to Bidders on a CD. The electronic copy of the Bidding Documents on a CD will be provided to each potential Bidder at no charge. A payment of $150.00 by check or money order payable to AMEC will be required for each hard copy of the Bidding Documents. This payment is reimbursement for production and handling costs and is not refundable. Only complete sets of the Bidding Documents will be furnished.

**BIDDER'S QUALIFICATIONS:**

All pre-qualified Bidders must submit, with the Bid, written evidence of Bidder's qualifications to perform the Work covered by the Contract Documents, and other documentation called for in Article 15 of the Instructions to Bidders.
HEALTH AND SAFETY:
The Successful Bidder shall protect the health and monitor the safety of its personnel, subcontractors, and other persons who may be affected by the Work and the environment. Throughout the full duration of the Work, the Successful Bidder shall comply with all applicable federal, state, and local regulations, and all applicable requirements of the Owner.

PRE-BID MEETING AND SITE VISIT:
All Bidders will be required to attend a Pre-Bid Meeting and Site Visit to discuss special requirements for this project. This meeting will be held at 11:30 AM EDT on May 4, 2012 in the Training Room on the second floor of the Grand Traverse County Building located at 400 Boardman Avenue, Traverse City, Michigan. During the pre-bid meeting, AMEC will supply to each prospective Bidder one copy of the Bidding Documents for the Brown Bridge Dam Removal and Restoration. A site visit to the Brown Bridge Dam project area will occur immediately following the meeting. Due to limited parking, it is requested that you and your project team please limit the number of vehicles travelling to the project site. Brown Bridge Dam is located in Sections 14 and 15, T26N, R10W, East Bay Township. The address is 3405 Brown Bridge Road. Contact AMEC for details. Attendance at the Pre-Bid Meeting and Site Visit is mandatory as a condition of bidding. Prospective Bidders must make an appointment with AMEC for subsequent visits as indicated in the Instructions to Bidders.

REQUESTS FOR INFORMATION:
Only written Requests for Information (RFI) will be accepted. Please direct requests regarding the Bidding Documents via email to Scott Rought (scott.rought@amec.com) at AMEC using the subject line of “Brown Bridge Dam Removal and Restoration RFP Request for Information”. Responses as well as the original requests will be provided via email to all of the prospective Bidders. The last day to submit questions is May 28th, 2012. Responses to RFI’s will be provided on two occasions: May 18, 2012 and May 30, 2012. AMEC will not respond to telephone questions regarding the Bidding Documents.

BID SECURITY:
Bid security in the amount of five percent (5%) of the Bidder’s Base Bid Price must accompany each Bid in accordance with the Instructions to Bidders.

AWARD, WAIVER AND REJECTION OF BIDS:
Bid shall remain valid and shall not be subject to withdrawal for a period of 60 calendar days after the Bid opening, except as provided in the Instructions to Bidders. A single Bid shall be submitted for all portions of the Work. The contract will be awarded pursuant to the requirements of applicable state and federal laws and regulations. To the extent permitted by such laws and regulations, AMEC reserves the right to waive any informalities and to reject any or all proposals, and to accept any proposal which in their judgment is in the best interest of the Boardman River Dams Implementation Team and AMEC or to re-advertise the RFP. The RFP does not commit AMEC to award a contract or pay any costs incurred during the preparation of the Bid.
PERFORMANCE AND PAYMENT BONDS:

Upon award of the contract, the Successful Bidder shall execute separate "Performance" and "Payment" Bonds using the forms contained in the Bidding Documents, each in the amount of one hundred percent (100%) of the Contract Price. The bonds shall be delivered to AMEC when the Contractor delivers the executed Agreement in accordance with the Instructions to Bidders.

By: ____________________________

AMEC Environment & Infrastructure, Inc.

Date: 5-10-12

END

INVITATION TO BID
INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the Subcontract Agreement.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Provisions regarding availability of the Bidding Documents are stated in the Invitation to Bid.

2.02 Complete sets of the Bidding Documents must be used in preparing Bids. The Engineer assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 The Engineer, in making copies of the Bidding Documents available on the above terms, does so only for the purpose of obtaining Bids for the Work and does not confer a license or grant for any other use. Refer to Article 15 of these Instructions to Bidders for provisions regarding return of hard copies of the Bidding Documents.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 Additional required qualifications documents to be submitted with the Bid are stated in Article 15 of these Instructions to Bidders.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions, and Hazardous Environmental Conditions

A. The Bidding Documents identify those reports of explorations and tests of subsurface conditions at or contiguous to the Site, and those drawings of physical conditions and Hazardous Environmental Conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities), that Engineer has used in preparing the Bidding Documents.

B. Copies of selected reports and drawings referenced in Paragraph 4.01.A are included on a CD which will be provided to all Bidders. Additional reports and drawings will be made available to any Bidder on request. Those reports and drawings are not part of the Contract Documents. Bidder is responsible for any interpretation or conclusion Bidder draws from information contained in such reports or shown or indicated on such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Engineer by owners of such Underground Facilities.
4.03 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to site conditions and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in the Subcontract Agreement.

4.04 On request, Owner will provide Bidder reasonable access to the Site to conduct visual observations, subject to written approval by the Owner. Bidder must request in writing a date and time for such site visits. In addition, Bidder must request written permission from the Owner to conduct any examinations, investigations, explorations, tests, or studies. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder must comply with all applicable laws and regulations relative to excavation and utility locating.

4.05 Reference is made to Section 01 11 00 of the Specifications for the identification of other work that is to be performed at the Site by Owner or others, if any, that relates to the Work contemplated by these Bidding Documents. On request, Owner or Engineer will provide to each Bidder access to or copies of contract documents (other than portions thereof related to price) for such other work if contractors have been retained for such other work.

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

A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. Attend a Pre-Bid Meeting and Site Visit at the time and location indicated in the Invitation to Bid;

C. Visit the Site (upon Owner’s written approval) and become familiar with and satisfy Bidder as to the general, local and Site conditions that may affect cost, progress, and performance of the Work;

D. Become familiar with and satisfy Bidder as to all federal, state and local laws and regulations that may affect cost, progress, and performance of the Work;

E. Carefully study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all reports and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site which have been identified;

F. Become aware of the general nature of the work to be performed by Owner and others, if any, at the Site that relates to the Work as indicated in the Bidding Documents;

G. 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; and

H. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.07 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific
means, methods, techniques, sequences and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID MEETING AND SITE VISIT

5.01  The date, time and place for the Pre-Bid Meeting and Site Visit are set forth in the Invitation to Bid.

5.02  Representatives of Owner and Engineer will be present at the Pre-Bid Meeting and Site Visit to discuss the Project. Bidders are required to attend and participate in the Pre-Bid Meeting and Site Visit. Engineer will transmit to all prospective Bidders of record such Addenda as Owner and Engineer consider necessary in response to questions arising at the Pre-Bid Meeting and Site Visit. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

6.01  The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be (or have been) obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01  All questions (Requests for Information) about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing as indicated in the Invitation to Bid. Interpretations or clarifications considered necessary by Engineer and Owner in response to such questions will be issued as indicated in the Invitation to Bid. Oral and other interpretations or clarifications will be without legal effect.

7.02  Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner and Engineer.

ARTICLE 8 - BID SECURITY

8.01  A Bid must be accompanied by Bid security made payable to the Engineer in an amount of five percent (5%) of Bidder’s maximum Bid Price (Base Bid Price). Bid security must be in the form of a certified check or bank money order or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of the Subcontract Agreement.

8.02  The Bid security of the Successful Bidder will be retained until 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 returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within the
time limit stated in the Notice of Award, Engineer may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Engineer believes to have a reasonable chance of receiving the award may be retained by the Engineer until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom the Engineer believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

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

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Subcontract Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 - SUBCONTRACTORS AND SUPPLIERS

12.01 Each Bidder must submit, with their Bid, lists of Subcontractors and Suppliers proposed for the Work on forms included as part of the Bidding Documents. For purposes of this Project, the terms “Subcontractors” and “Suppliers” are deemed to include: firms or persons retained for off-site transport and disposal of excavated and removed materials; and facilities or locations at which excavated and removed materials are disposed of through landfilling or other final disposal method. If requested by Owner or Engineer, the Successful Bidder, and any other Bidder so requested, shall, within five calendar days after the date of the request, submit a statement of experience with pertinent information regarding similar projects and other evidence of qualification for each Subcontractor and Supplier.

12.02 If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Engineer may, before the Notice of Award is given, request the apparent Successful Bidder to submit a substitute, in which case the apparent Successful Bidder shall submit an acceptable substitute, Bidder’s Bid price will be increased (decreased) by the difference in cost occasioned by such substitution, and Engineer may consider such price adjustment in evaluating Bids and making the Contract award.

12.03 If apparent Successful Bidder declines to make any such substitution, Engineer may award the Contract to another Bidder that proposes to use acceptable Subcontractors or Suppliers. Declining
to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier 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 revocation of such acceptance after the Effective Date of the Agreement.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

13.02 All blanks on the Bid Form must be completed by printing in black ink, by typewriter, or may be filled out electronically in accordance with the requirements of the Bidding Documents. The Bid must be signed in ink. Erasures or alterations to printed or typewritten information must be initialed in ink by the person signing the Bid Form.

13.03 A Bid by a corporation must be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

13.04 A Bid by a partnership must 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 official address of the partnership must be shown below the signature.

13.05 A Bid by a joint venture or other entity must be executed in the manner indicated on the Bid Form. The official address must be shown below the signature.

13.06 All names must be typed or printed in ink below the signatures.

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

13.08 The address and telephone numbers for communications regarding the Bid must be shown.

13.09 The Bid must contain evidence of Bidder’s authority and qualification to do business in the State of Michigan, or covenant to obtain such qualification prior to award of the Contract. Bidder’s state contractor license number, if applicable, must also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 Lump Sum and Unit Price Items:

A. Bidders must submit a bid price for each item of Work listed in the Bid Schedule (included as part of the Bid Form).

B. The total of all prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price bid as applicable. The final quantities and Contract Price will be determined in accordance with the provisions of the Subcontract Agreement.
C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

14.02 Allowances:

A. For cash allowances, the Bid price shall include such amounts as the bidder deems proper for Contractor’s overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents.

ARTICLE 15 - SUBMITTAL OF BID

15.01 A copy of the Bid Form included in the Bidding Documents must be completed and submitted with the Bid security and the following documents:

A. Written certification to document that all proposed on-site personnel performing activities involving disturbance of Power House have completed, or will have completed prior to start of the Work, the required up-to-date OSHA training and evidence of participation in a Medical Surveillance Program in accordance with all applicable local, state and federal regulations (including OSHA regulations, 29 CFR 1910.120).

B. Listings of Subcontractors and Suppliers proposed for the Work as stated in Article 12 of these Instructions to Bidders, including listings of transport companies and primary and secondary disposal facilities proposed to be used for the Work. The information shall be provided on forms included as part of the Bidding Documents.

C. Draft Site-Specific Health and Safety Plan (SSHASP), Draft Work Plan, and Draft Construction Progress Schedule. The draft documents submitted with the Bid will not be considered contractual, but will be used in the evaluation of the Bids. Detailed documents will be required after issuance of the Notice to Proceed and must include the items identified in Section 01 31 00 of the Specifications.

D. A Noncollusion Affidavit (form included in the Bidding Documents).

15.02 A Bid must be submitted no later than the date and time prescribed and at the place indicated in the Invitation to Bid and must be enclosed in an opaque sealed envelope, plainly marked on the exterior with the following:

BID FOR: BROWN BRIDGE DAM REMOVAL AND RESTORATION

15.03 The envelope must also indicate the Bid opening time and date. The contents of the envelope must include: completed Bid Form; Bid security; and the other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED”.

15.04 Hard copies and electronic copies of the Bid must be submitted as indicated in the Invitation to Bid. Each copy of the Bid must be an exact counterpart of the other, fully executed with original signatures and corporate seal as applicable.
15.05 All hard copies of the Bidding Documents, along with hard copies of all other documents issued for the purpose of preparing Bids, must be returned intact with the Bid.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the 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.

16.02 If within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Engineer and promptly thereafter demonstrates to the reasonable satisfaction of Engineer 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 privately. [An abstract of the amounts of the Base Bids and major alternates, if any, may 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 Engineer may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

18.02 Extensions of time when Bids will remain open beyond the stated period will be made only by mutual agreement between the Owner, Engineer, the Successful Bidder, and the surety, if any, for the Successful Bidder.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Refer to the Invitation to Bid for the basis for acceptance or rejection of Bids.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner and Engineer 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.

19.04 Owner and Engineer may conduct such investigations as Owner and Engineer deem necessary in their sole discretion to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors and Suppliers to perform the Work in accordance with the Contract Documents.
ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 The Subcontract Agreement sets forth the Engineer's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Engineer, it shall be accompanied by the required bonds. Certificates of insurance shall be delivered to the Engineer prior to start of any Work on the Site.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Engineer gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement. Within the time limit stated in the Notice of Award, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and the other Contract Documents to Engineer. Within 10 days thereafter, Engineer will deliver one fully signed copy of the Agreement to Successful Bidder with a complete set of the Contract Documents (including the Drawings).

ARTICLE 22 - HEALTH AND SAFETY

22.01 The Successful Bidder shall protect the health and monitor the safety of its personnel, subcontractors, and other persons who may be affected by the Work and the environment. Throughout the full duration of the Work, the Successful Bidder shall comply with all applicable federal, state, and local regulations, and all applicable requirements of the Owner.

22.02 Prior to mobilization to the Site, the Successful Bidder shall submit to the Owner and Engineer for their review a Site-Specific Health and Safety Plan (SSHASP) to provide for the safe execution of the Work in compliance with all applicable regulations. The SSHASP will be reviewed and commented on, but will not be approved by the Owner or Engineer.

END

INSTRUCTIONS TO BIDDERS
BID FORM

PROJECT IDENTIFICATION:  **BROWN BRIDGE DAM REMOVAL AND RESTORATION, BOARDMAN RIVER, EAST BAY TOWNSHIP, GRAND TRAVERSE COUNTY, MI**

OWNER:  Boardman River Dams Settlement Agreement Implementation Team  
Grand Traverse County, Michigan

ENGINEER:  AMEC Environment & Infrastructure, Inc. (AMEC)  
41 Hughes Drive  
Traverse City, Michigan 49696  
Attention: Ms. Sandra Sroonian, Senior Principal Engineer  
E-mail: sandra.sroonian@amec.com  
Office Phone: (231) 922-9050, ext. 201

THIS BID IS SUBMITTED TO:  AMEC Environment & Infrastructure, Inc. (AMEC)  
41 Hughes Drive  
Traverse City, Michigan 49696  
Attention: Mr. Scott Rought

1. **BIDDER’S ACKNOWLEDGEMENTS AND REPRESENTATIONS**

1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Engineer 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.

1.02 Bidder accepts all of the terms and conditions of the Instructions to Bidders. 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 Engineer and Owner.

1.03 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

```
<table>
<thead>
<tr>
<th>Addendum Number</th>
<th>Addendum Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local laws and regulations that may affect cost, progress, and performance of the Work.
D. Bidder has carefully studied all information made available to Bidders relating to existing subsurface and physical conditions and underground facilities at the Site.

E. Bidder is aware of the general nature of work to be performed by Owner, Engineer, and others at the Site (if any) that relates to the Work as indicated in the Bidding Documents.

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

G. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

H. Bidder will submit written evidence of its authority to do business in the State of Michigan not later than the date of execution of the Agreement.

1.04 Bidder further represents 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 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 sought by collusion to obtain for itself any advantage over any other Bidder or over Owner or Engineer, and has completed and executed the Non-Collusion Affidavit form (included as an attachment to this Bid).

2. BASIS OF BID

2.01 Bidder will complete the Work in accordance with the Contract Documents for the prices listed on the Bid Schedule, which is attached hereto and made a part of this Bid Form. Bidder acknowledges that quantities are not guaranteed and final payment will be based on actual quantities determined as provided in the Contract Documents. Final payment for Unit Price Items will be based on the actual quantities approved by Engineer, multiplied by the indicated unit prices. The total Base Bid Price is indicated below:

BASE BID PRICE:

____________________________________________________ Dollars

($ __________________________ )
3. TIME OF COMPLETION

3.01 Bidder agrees that, based on the intent of the Engineer to issue a Purchase Order by July 9, 2012, the Work will be substantially complete on or before October 31, 2012, and will be completed and ready for final payment on or before November 30, 2012. Substantially complete shall be as defined in the Contract Documents and shall include the completion of all land disturbing activities within the river channel.

4. ATTACHMENTS TO THIS BID

4.01 The following documents are attached to and made a condition of this Bid:

A. Required documents listed in Article ___ of the Instructions to Bidders.

5. BID SUBMITTAL

5.01 This Bid is submitted by:

An Individual:

Name (typed or printed): _______________________________

By: ________________________________ (SEAL)

(Individual's signature)

Doing business as: ________________________________

Business address: ________________________________

Phone No.: ____________________ FAX No. ____________________

A Partnership:

Partnership Name: ________________________________ (SEAL)

By: ________________________________

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

Name (typed or printed): ________________________________

Business address: ________________________________

Phone No.: ____________________ FAX No. ____________________

(Signatures continued on subsequent pages 4 and 5)
A Corporation:
Corporation Name: ________________________________ (SEAL)
State of Incorporation: __________________________
Type (e.g. General Business, Professional, Service, Limited Liability): ________________
By: __________________________________________________________________________
(Signature – attach evidence of authority to sign)
Name (typed or printed): ________________________________
Title: ________________________________________ (CORPORATE SEAL)
Attest ____________________________________________
(Signature of Corporate Secretary)

Business address: ______________________________________

____________________________________________________________________
Phone No.: ________________ FAX No. ________________

Date of Qualification to do business in Kentucky is __________

A Joint Venture:
Name of Joint Venture: ________________________________

First Joint Venturer Name: ________________________________ (SEAL)
By: __________________________________________________________________________
(Signature of joint venture partner – attach evidence of authority to sign)
Name (typed or printed): ________________________________
Title: ________________________________

Second Joint Venturer Name: ________________________________ (SEAL)
By: __________________________________________________________________________
(Signature of joint venture partner – attach evidence of authority to sign)
Name (typed or printed): ________________________________

(Signatures continued on page 5)
Brown Bridge Dam Removal and Restoration
May 10, 2012

Title: ________________

Business Address: ___________________________________________

______________________________________________________________

Phone No.: ________________ FAX No. ________________

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

BID FORM SUBMITTED on ________________, 20__

State Contractor License No. ____________________________ (if applicable)
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
<th>ESTIMATED QUANTITY&lt;sup&gt;1&lt;/sup&gt;</th>
<th>UNITS</th>
<th>UNIT PRICE</th>
<th>BID PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Work Plans, Submittals, and Quality Control</td>
<td>1</td>
<td>Lump Sum</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>2.0</td>
<td>Mobilization/Demobilization</td>
<td>1</td>
<td>Lump Sum</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>3.0</td>
<td>Temporary Facilities and Controls</td>
<td>1</td>
<td>Lump Sum</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>4.0</td>
<td>Dam Demolition – Demolish Powerhouse, Log Sluice, Wingwalls, Fish Ladder and Part of Corewall</td>
<td>1</td>
<td>Lump Sum</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>4.1</td>
<td>Dam Demolition -Transportation and Off-site Disposal of Construction Debris</td>
<td>2,200</td>
<td>Ton</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>4.2</td>
<td>Dam Demolition – Construction, Operation and Removal of Temporary Dewatering Structure</td>
<td>1</td>
<td>Lump Sum</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>4.3</td>
<td>Dam Demolition – Excavate Soil and Sediment in Powerhouse Forebay from El 783 ft to 768 ft – Station 3+50 to 4+35 (Excavation in the Wet)</td>
<td>3,050</td>
<td>CY</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>4.4</td>
<td>Dam Demolition – Excavate North and South Embankment – Stations 1+70 to 7+00.</td>
<td>28,000</td>
<td>CY</td>
<td>$____________</td>
<td>$____________</td>
</tr>
<tr>
<td>ITEM NO.</td>
<td>DESCRIPTION</td>
<td>ESTIMATED QUANTITY(^1)</td>
<td>UNITS</td>
<td>UNIT PRICE</td>
<td>BID PRICE</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------</td>
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<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td>4.5</td>
<td>Dam Demolition – Regrade Top of Embankments to El. 800 ft and Cover Corewall.</td>
<td>1,900</td>
<td>CY</td>
<td>$__________</td>
<td>$__________</td>
</tr>
<tr>
<td>4.6</td>
<td>Dam Demolition – Backfill Channel between Station 2+40 and 4+35.</td>
<td>2,900</td>
<td>CY</td>
<td>$__________</td>
<td>$__________</td>
</tr>
<tr>
<td>5.0</td>
<td>River Channel and Floodplain Restoration – Excavate Soil and Sediment from River Channel and Floodplain and Backfill in Spoils Areas – Stations 88+50 to 133+00.</td>
<td>149,500</td>
<td>CY</td>
<td>$__________</td>
<td>$__________</td>
</tr>
<tr>
<td>5.1</td>
<td>River Channel and Floodplain Restoration – Excavate Soils and Sediment from the River Channel and Floodplain and Backfill in Spoils Areas – Stations 56+00 to 88+50.</td>
<td>46,000</td>
<td>CY</td>
<td>$__________</td>
<td>$__________</td>
</tr>
<tr>
<td>5.2</td>
<td>River Channel and Floodplain Restoration – Excavate Soils and Sediment from the River Channel and Floodplain and Backfill in Spoils Areas – Stations 7+00 to 13+50.</td>
<td>4,700</td>
<td>CY</td>
<td>$__________</td>
<td>$__________</td>
</tr>
<tr>
<td>5.3</td>
<td>Large Wood, Logs – Bank Treatment Stations 3+80 to 5+80 and 11+00 to 12+00.</td>
<td>120</td>
<td>Each</td>
<td>$__________</td>
<td>$__________</td>
</tr>
</tbody>
</table>
# BID SCHEDULE

## BROWN BRIDGE DAM REMOVAL AND RESTORATION

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
<th>ESTIMATED QUANTITY&lt;sup&gt;1&lt;/sup&gt;</th>
<th>UNITS</th>
<th>UNIT PRICE</th>
<th>BID PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4</td>
<td>Large Wood, Rootwads – Bank Treatment Stations 3+80 to 5+80 and 11+00 to 12+00.</td>
<td>120</td>
<td>Each</td>
<td>$_____________</td>
<td>$_____________</td>
</tr>
<tr>
<td>5.5</td>
<td>Maintain Sediment Traps.</td>
<td>4</td>
<td>Each</td>
<td>$_____________</td>
<td>$_____________</td>
</tr>
<tr>
<td>6.0</td>
<td>Revegatation – Lower Impoundment Steep Slopes.</td>
<td>3.6</td>
<td>Acres</td>
<td>$_____________</td>
<td>$_____________</td>
</tr>
<tr>
<td>6.1</td>
<td>Revegatation – Lower Impoundment Floodplain Areas.</td>
<td>1.1</td>
<td>Acres</td>
<td>$_____________</td>
<td>$_____________</td>
</tr>
<tr>
<td>6.2</td>
<td>Revegatation – Upper Impoundment Floodplain Areas.</td>
<td>7.1</td>
<td>Acres</td>
<td>$_____________</td>
<td>$_____________</td>
</tr>
</tbody>
</table>

**TOTAL BASE BID PRICE**

$ ____________________________  $ ____________________________

*Written Out*

Notes: 1. Estimated quantities are **Not To Be Exceeded**, unless prior authorization is provided by the Engineer in accordance with the provisions of the Contract Documents.
BID SCHEDULE
BROWN BRIDGE DAM REMOVAL AND RESTORATION

In the event that the envisioned scope of Work changes and modifications are required as discussed in the Contract Documents, or means and methods established by the Contract Documents are modified, the Contract Price will be adjusted on the basis of the following unit prices multiplied by the actual quantities, which will be added to the Contract Price when the actual extent of Work is determined:

<table>
<thead>
<tr>
<th>ALLOWANCE NO.</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
<th>BID PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Reclaimed Native Gravel</td>
<td>CY</td>
<td>$_________</td>
</tr>
<tr>
<td>2.</td>
<td>FES Bank Treatment – Stations 2+00 to 4+00</td>
<td>Face Feet</td>
<td>$_________</td>
</tr>
<tr>
<td>3a.</td>
<td>Large Wood, Logs, furnished and installed in Upper Impoundment</td>
<td>Each</td>
<td>$_________</td>
</tr>
<tr>
<td>3b.</td>
<td>Large Wood, Rootwads, furnished and installed in Upper Impoundment</td>
<td>Each</td>
<td>$_________</td>
</tr>
<tr>
<td>3c.</td>
<td>Large Wood, Logs, transported and staged in Upper Impoundment</td>
<td>Each</td>
<td>$_________</td>
</tr>
<tr>
<td>3d.</td>
<td>Large Wood, Rootwads, transported and staged in Upper Impoundment</td>
<td>Each</td>
<td>$_________</td>
</tr>
<tr>
<td>3e.</td>
<td>In-stream Habitat Enhancement – Hourly Rate for Excavator, Track Dump and Operators</td>
<td>Hour</td>
<td>$_________</td>
</tr>
<tr>
<td>ALLOWANCE NO.</td>
<td>DESCRIPTION</td>
<td>UNITS</td>
<td>BID PRICE</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td>4</td>
<td>Dam Demolition – Design, Construction, Operation and Removal of Alternative</td>
<td>Lump Sum</td>
<td>$________</td>
</tr>
<tr>
<td></td>
<td>Temporary Dewatering Structure as Proposed by Contractor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bid Submitted By: ____________________________ Date: __________ Phone No. ________________

Company Name

By: ____________________________

(Signature of authorized representative)
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:
Project (Brief Description Including Location):

BOND
Bond Number:
Date (Not later than Bid due date):
Penal sum ________ (Words) ________ (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER
By: ____________________________
Signature and Title
Attest: __________________________
Signature and Title

SURETY
By: ____________________________
Signature and Title
(Attach Power of Attorney)
Attest: __________________________
Signature and Title

Note: Above addresses are to be used for giving required notice.
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 Surety’s liability.

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

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

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

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state 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.
TRANSPORT AND DISPOSAL FACILITY INFORMATION

Engineer requires that each Bidder submit information on proposed transport companies and disposal facilities to be used by the Bidder.

**Proposed Transport Companies**

List proposed primary and secondary transport companies below. Also, provide copies of applicable permits and certifications.

<table>
<thead>
<tr>
<th>Name of Company (including address and phone number)</th>
<th>Regulatory Status of the Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Proposed Hazardous Waste Disposal Facilities**

List proposed primary and secondary disposal facilities below. Also, provide copies of applicable permits and certifications, and identification of haul route to each facility.

<table>
<thead>
<tr>
<th>Name of Facility (including address and phone number)</th>
<th>Regulatory Status of the Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<td></td>
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<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Form continued on page 004335-2)
**Proposed Non-Hazardous Waste Disposal Facilities**

List proposed primary and secondary disposal facilities below. Also, provide copies of applicable permits and certifications, and identification of haul route to each facility.

<table>
<thead>
<tr>
<th>Name of Facility (including address and phone number)</th>
<th>Regulatory Status of the Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

Date: __________________________

Bidder’s Name: __________________________________________________________

Authorized Signature: ________________________________________________

Name & Title of Signer (Printed) _______________________________________

Business Address ______________________________________________________

______________________________________________________________

Phone Number ___________________ Fax Number ____________________
## SUBCONTRACTOR LIST

List major subcontractors (if any) who will be used for the Work. Attach additional sheets as necessary.

<table>
<thead>
<tr>
<th>Subcontractor (Name, Address, Tele, No.)</th>
<th>Work to Be Performed</th>
<th>Est. % of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date: ________________

Bidder’s Name: ________________

Authorized Signature: ________________

Name & Title of Signer (Printed) ________________

Business Address ________________

Phone Number __________________ Fax Number __________________
SUPPLIER LIST

List all major suppliers for the Work. Attach additional sheets as necessary.

<table>
<thead>
<tr>
<th>Manufacturer and Distributor (Name, Address, Tel. No.)</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date: __________________________

Bidder’s Name: ____________________________________________

Authorized Signature: ______________________________________

Name & Title of Signer (Printed) ______________________________

Business Address __________________________________________

_____________________________________________________________________

Phone Number __________________________ Fax Number _________________
NON-COLLUSION AFFIDAVIT

State of __________________________) ss.
County of __________________________

__________________________ being first duly sworn, deposes and says that:

(1) He is the Owner, Partner, Officer, Representative or Agent [circle one] of __________________________, the Bidder that has submitted the attached Bid.

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with the Work for which the attached Bid has been submitted; or to refrain from bidding in connection with such Work; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost elements of the Bid price or to fix any overhead, profit, or cost elements of the Bid price or the Bid price of any other Bidder or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against Owner, or any person interested in the proposed Work;

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the bidder or any other of its agents, representatives, owners, employees or parties in interests, including this affidavit.

Subscribed and sworn to before me BY: __________________________

__________________________ (Signature)

this _____ day of ________, 20__.

__________________________ (Title)

My commission expires ______________.

END

NON-COLLUSION AFFIDAVIT
CONTRACTING REQUIREMENTS
NOTICE OF AWARD

TO:

(SUCCESSFUL BIDDER)

ADDRESS:

PROJECT:

You are notified that your Bid dated ________________ , 20__ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for all Work as specified or indicated in the Contract Documents.

The Contract Price (as presented in the Bid Form and attached to the Agreement) is dollars ($ ____________).

[Three] copies of the proposed Contract Documents, including the Agreement form, accompany this Notice of Award.

You must comply with the following conditions precedent within ten (10) days of the date of this Notice of Award, that is by __________, 20__:

1. Deliver to the Engineer (on behalf of Owner) three fully executed counterparts of the Agreement. Each of the Contract Documents must also bear your signature on the cover page of the Project Manual, and on the cover sheet of the Drawings.

2. Deliver with the executed Contract Documents the Contract security (Bonds) as specified in the Instructions to Bidders and in the Agreement.

3. [Other conditions precedent:]

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

Within ten (10) days after you comply with the above conditions, Owner will return to you one fully signed executed counterpart of the Contract Documents.

(ENGINEER)

By:

(AUTHORIZED SIGNATURE)

(TITLE)

(Signatures continued on Page 00 51 00 - 2)
NOTICE OF AWARD (Cont.)

ACCEPTANCE OF NOTICE OF AWARD

______________________________________________
(CONTRACTOR)

By:
______________________________________________
(AUTHORIZED SIGNATURE)

______________________________________________
(TITLE)

______________________________________________
(DATE)
This Subcontract Agreement ("Agreement") is made this day of , 20 by and between AMEC Environment & Infrastructure, Inc., a corporation, ("AMEC") and [ENTER SUBCONSULTANT NAME HERE], a [ENTER CORPORATION, PARTNERSHIP, SOLE PROPRIETOR OR LLC], ("SUBCONSULTANT").

NOW, THEREFORE, for good and valuable consideration, including the promises contained herein, the receipt and adequacy of which is mutually acknowledged, the parties agree as follows:

1.0 SCOPE OF SERVICES

1.1 SUBCONSULTANT shall provide services in accordance with the provisions of this Agreement and as described in the Work Order(s) to be issued by AMEC from time-to-time hereunder (individually, "Work Order" and, collectively, "Work Orders") in the form attached hereto as Exhibit “A”, ("Services"). Services provided without a signed Work Order or outside the scope of Services described in a Work Order shall be at SUBCONSULTANT’s risk and account.

1.2 By signing each Work Order, SUBCONSULTANT acknowledges that it has satisfied itself as to the nature and extent of the Services. Any representation(s) made by AMEC, but not expressly included in a Work Order, shall be only for the information of SUBCONSULTANT and shall not render AMEC responsible or liable therefore.

1.3 This Agreement is being entered into for the purpose of retaining SUBCONSULTANT to provide certain services required of AMEC by its client under that prime agreement ("CLIENT") which will be identified in the applicable Work Order ("Prime Agreement"). Each Work Order will incorporate by reference an attachment comprised of a redacted copy of the Prime. SUBCONSULTANT shall be bound to AMEC to the same extent that AMEC is bound to CLIENT under the Prime Agreement. SUBCONSULTANT shall similarly incorporate the Flow-Down Provisions in any further subcontract entered into by SUBCONSULTANT with any sub-subconsultant. To the extent that any provision contained in this Agreement conflicts with any Flow-Down Provision(s), the Flow-Down Provision(s) shall govern. By signing a Work Order, SUBCONSULTANT represents that it has requested, received and reviewed a copy of the Flow-Down Provisions and is familiar with its provisions or has elected not to receive a copy.

2.0 TECHNICAL AND CONTRACTUAL REPRESENTATIVES

2.1 AMEC’s contractual representative for this Agreement shall be [Enter Subcontract Administrator's Name Here], unless and until AMEC notifies SUBCONSULTANT otherwise ("Contractual Representative"). Any correspondence or discussions which affect the terms and conditions of this Agreement shall be conducted with the Contractual Representative.

2.2 In each Work Order, AMEC will designate a contractual representative ("Work Order Contractual Representative") and a technical representative ("Technical Representative").

3.0 CHANGES IN THE SERVICES

3.1 Changes in the Services may be accomplished after execution of, and without voiding, this Agreement or any applicable Work Order should circumstances arise which reasonably require such change. Such changes shall be made by Change Order, as provided in Section 3.2 below, or by Change Directive, as provided in Section 3.3 below, signed by the Work Order Contractual Representative.

3.2 In the event it becomes necessary to change, delete from or add to the Services in a manner that causes a material increase or decrease in the time or cost, or both, required for SUBCONSULTANT to perform the Services, such change, deletion or addition shall be evidenced by a change order attached hereto as Exhibit “B” ("Change Order"). To the extent that a Change Order materially changes the cost or time, or both, to perform the Services, an equitable adjustment, either upward or downward, may be made in the contract time for performance or compensation, or both, as applicable. SUBCONSULTANT shall not proceed with any such changed or additional Services until mutual execution of a Change Order, if applicable.

3.3 Notwithstanding Section 3.2 above, AMEC reserves the right, in its discretion, to make changes in or additions to the Services that do not materially add to SUBCONSULTANT’s time or cost, or both, to perform the Services, and to issue a written directive ("Change Directive") which directs SUBCONSULTANT to perform such modified and/or additional Services without an adjustment, if any, in compensation or schedule, or both. If SUBCONSULTANT is given a Change Directive by AMEC’s Technical Representative, SUBCONSULTANT shall promptly comply with the Change Directive, notwithstanding any disagreement. If applicable, SUBCONSULTANT shall give written notice of its intent to seek a Change Order for the changed or additional Services and request an adjustment in compensation or schedule, or both, to AMEC within ten (10) calendar days after receipt of the Change Directive. Failure to timely give this notice shall constitute an irrevocable waiver by SUBCONSULTANT of all rights to seek such an adjustment.

4.0 PAYMENT

4.1 SUBCONSULTANT shall provide the Services set forth in each Work Order for the compensation also set forth in each Work Order. Compensation will be determined as follows:

4.1.1 For cost reimbursement, compensation shall not exceed the amount set forth in the Work Order, unless additional sums are authorized in advance by AMEC in writing. Progress payments shall be made in accordance with the rates and/or unit prices set forth on the Schedule of Fees attached to the Work Order as Attachment 4 ("Price/Fee Schedule") or as specifically set forth in or supplemented by a Work Order or any exhibits or attachments thereto. No item(s) can be invoiced unless it is included in the Price/Fee Schedule. Unanticipated charges or expenses can be invoiced only upon prior written agreement of AMEC; or

4.1.2 Where the parties have mutually agreed to make progress payments for Services under a lump sum fee schedule, such payments shall be made on the basis of the percentage of the
4.2 SUBCONSULTANT shall invoice AMEC not more frequent than once every thirty (30) days for Services completed in accordance with the terms of this Agreement and the applicable Work Order. All invoices shall be submitted not later than thirty (30) days after performance of the Services reflected thereon unless AMEC authorizes an extension of time. Invoices received later than thirty (30) days after performance of the Services are subject to rejection by AMEC. Partial lien waivers must be executed by SUBCONSULTANT, each sub-subcontractor and sub-subconsultant who has performed any of the Services, and each materialman who has supplied materials, and submitted along with each invoice.

4.3 Upon request, SUBCONSULTANT shall provide AMEC with copies of time sheets, expense records and any other billed expenditures relating to the Services that are reflected on any invoice.

4.4 AMEC shall submit SUBCONSULTANT’s invoice with its next regular invoice to CLIENT. Payment of any amounts not in dispute will be made to SUBCONSULTANT within seven (7) business days, excluding Saturdays, Sundays and federal holidays, (“Business Days”) of receipt by AMEC of the applicable payment from CLIENT. Payment of any invoice submitted to AMEC by SUBCONSULTANT is made expressly contingent upon receipt by AMEC of payment of said invoice from CLIENT, except when payment to AMEC is withheld by CLIENT for cause and such cause does not involve the performance or other obligations of SUBCONSULTANT.

4.5 AMEC will not make Offshore Payments to SUBCONSULTANT under this Agreement unless a written request is received from SUBCONSULTANT and is approved by AMEC’s Contractual Representative in writing. An Offshore Payment is defined as a payment made by AMEC to SUBCONSULTANT outside the country where the Services are performed and/or the SUBCONSULTANT’s office location designated on the Work Order.

4.6 In the event SUBCONSULTANT owes any sum(s) to AMEC under this Agreement, AMEC may offset such sum(s) against any compensation due SUBCONSULTANT hereunder, or if no sums are otherwise payable to SUBCONSULTANT, SUBCONSULTANT will pay such sum(s) within fifteen (15) Business Days after receipt of AMEC’s invoice therefor. AMEC shall have such right and remedy without prejudice to any other rights and remedies it may have against SUBCONSULTANT under this Agreement, at law or in equity.

4.7 The SUBCONSULTANT’s final invoice must be accompanied by a properly completed and executed Subcontract Work Order Closeout Form and Lien Release attached hereto as Exhibit “C”.

4.8 The acceptance of any payment by AMEC will not constitute acceptance of Services that have not been performed in strict accordance with the provisions of this Agreement and the applicable Work Order(s).

4.9 All invoices shall be delivered to AMEC in accordance with the instructions identified on each Work Order.

4.10 SUBCONSULTANT’s Federal ID number is ____________

5.0 LIENS

5.1 SUBCONSULTANT will pay and satisfy all claims for labor and material employed or used in performing the Services and shall defend, indemnify and hold harmless AMEC and CLIENT from all claims, losses, costs, expenses, bonding fees, payments and liens of any kind arising from the Services. SUBCONSULTANT shall execute and deliver signed lien releases and waivers of claim from it and all of its subcontractors, subconsultants and vendors that CLIENT or AMEC may require as a condition of payment. If a lien should be filed against a project site or the property of CLIENT or AMEC by a subcontractor, subconsultant or vendor of SUBCONSULTANT, SUBCONSULTANT promptly will pay in full or bond over such lien; provided, that AMEC, without prejudice to its rights under this Agreement, at law or in equity, shall have the right to take all steps necessary to remove such lien as well as any lien filed by SUBCONSULTANT, including payment of the underlying debt with offset against payments due SUBCONSULTANT hereunder, and SUBCONSULTANT shall reimburse AMEC for all expenses incurred by AMEC as a result of the filing and removal of any such lien, including court costs and reasonable attorneys’ fees. The above provisions will not apply to the extent expressly prohibited by Law (hereinafter defined).

6.0 RECORDS AND AUDIT RIGHTS

6.1 SUBCONSULTANT shall retain all records, including, but not limited to, all plans, specifications, drawings, field notes, reports, sketches, correspondence, logs, manuals, directives, memoranda and other documents, records or information relating to the Services (“Project Records”) and will keep all appropriate books and records reflecting the charges and expenses related to the Services (“Accounting Records”) in accordance with generally accepted accounting practices and principles. Upon request from AMEC or CLIENT, SUBCONSULTANT shall make the Project Records and/or Accounting Records reasonably relating to the Services available during normal business hours for review or audit by AMEC, CLIENT or their respective representatives at their expense. SUBCONSULTANT shall retain, and grants AMEC the right to audit, the Project Records and Accounting Records for a period of three (3) years after completion of the Services or such longer time as is mutually agreed to by the parties in writing or as required by the Prime Agreement.

7.0 PROJECT SITE(S)

7.1 SUBCONSULTANT must coordinate its activities with other contractors at the project site so as not to unduly interfere with the use of, or work on, a project site by CLIENT or other contractors.

7.2 Any of SUBCONSULTANT’s field, testing, laboratory, or other equipment that becomes contaminated by known or suspected hazardous materials or other regulated contaminants at a project site must be decontaminated, and any contaminants must be properly containerized, labeled and secured on the project site or, if required by the applicable Work Order, properly disposed of by SUBCONSULTANT. Unless stated otherwise in the applicable Work Order, the costs to perform this task shall be deemed to have been included in SUBCONSULTANT’s initial price for the Services under that Work Order.
7.3 SUBCONSULTANT shall “abandon” and grout or cap each drilled borehole in a manner so as to prevent the creation of vertical migration pathways and/or the development of surface depressions that could be detrimental to future use of the project site.

7.4 AMEC shall use reasonable efforts to locate above and below ground utilities on a project site. Once located, SUBCONSULTANT shall be responsible for all damage(s) to all utilities and subterranean structures that result from performance of the Services.

7.5 Upon completion of the Services, SUBCONSULTANT shall clear away all tools, machinery, debris, rubbish and any and all other materials which may be on or about the applicable project site(s) and shall do everything necessary to restore each project site in a complete and workmanlike manner.

8.0 SAFETY

8.1 SUBCONSULTANT shall take reasonable precautions to perform the Services in a safe manner. SUBCONSULTANT will be solely responsible for working conditions on those portions of the project site reasonably within SUBCONSULTANT’s work area and/or where SUBCONSULTANT is taking Samples (hereinafter defined) and in its laboratory and facilities, if applicable, including the safety of all persons and property during performance of the Services, in addition to providing any and all safety equipment or articles necessary to protect its employees and agents and to comply with applicable OSHA regulations and requirements of the owner and/or operator of the project site. Any monitoring of SUBCONSULTANT’s procedures conducted by AMEC will not include a review of the adequacy of SUBCONSULTANT’S safety measures in, on, adjacent to, or near any project site or in SUBCONSULTANT’s laboratory and facilities, if applicable. AMEC is not responsible for any laboratory safety, and AMEC’s responsibility for project site safety is limited solely to its own employees and the provision of appropriate training, supervision and personal protective equipment for those employees.

8.2 If property damage or bodily injury occurs in the course, or as a result, of SUBCONSULTANT’s performing the Services, SUBCONSULTANT shall immediately notify AMEC. An initial written incident report will be prepared by SUBCONSULTANT, followed by a detailed written account of the incident within three (3) calendar days after its occurrence in a form acceptable to AMEC and which includes the results of a comprehensive incident investigation identifying root causes and detailing the corrective actions SUBCONSULTANT will implement to prevent the recurrence of a similar incident. The final, written incident report shall be submitted to AMEC within five (5) calendar days of the occurrence. A written request for an extension of the submission deadline must be provided by SUBCONSULTANT to, and agreed to by, AMEC prior to expiration of the applicable submission deadline.

8.3 SUBCONSULTANT acknowledges that it is familiar with the Services and will familiarize itself with (i) the known and the inherent hazardous conditions of each project site prior to commencing performance of the Services, and (ii) the necessity for the use of safety measures by its personnel during performance of the Services. SUBCONSULTANT shall comply with all applicable safety Laws (hereinafter defined) including, but not limited to, those under federal and state occupational, safety, and health acts, and in particular the provisions of OSHA 29 CFR 1910 and 1926, and shall comply with the more stringent of those or any site specific safety programs and procedures when required by AMEC, or CLIENT, or both.

8.4 If an emergency caused by SUBCONSULTANT, its employees or agents, threatens the life or health of any person(s) or property damage, and it is impracticable for AMEC to obtain prior authorization from SUBCONSULTANT, AMEC may, but is not obligated to, take such reasonable actions as it deems appropriate to attempt to mitigate or avoid the threatened injury or damage. SUBCONSULTANT shall reimburse all of AMEC’s costs incurred thereby.

8.5 SUBCONSULTANT shall prepare and submit to the Technical Representative an appropriate Health and Safety Plan or a job-specific Job Hazard Analysis, as specified in the applicable Work Order.

8.6 SUBCONSULTANT shall provide AMEC with such information as is required under 29 CFR 1910.1200-Hazardous Communication, including Material Safety Data Sheets as appropriate, for any hazardous chemicals (which may include solids, liquids or gases) brought onto any project site by SUBCONSULTANT, its employees and agents.

8.7 If SUBCONSULTANT’s personnel will be entering a controlled work area(s) at a project site when performing the Services, a copy of the site-specific Health and Safety Plan prepared by AMEC or CLIENT, or both, if any, will be provided to SUBCONSULTANT for its information, and SUBCONSULTANT will discuss the same with its personnel who will sign the Health & Safety Plan to affirm such discussion was held prior to beginning performance of the Services. This sharing of information does not create any rights in parties other than AMEC and SUBCONSULTANT and does not create any duty or obligation of AMEC to the employees, agents and sub-subconsultants of SUBCONSULTANT.

8.8 All employees of SUBCONSULTANT who will enter a controlled work area (s) at any project site which is known or suspected to contain hazardous constituents or materials must demonstrate compliance with all training and personnel health monitoring programs that are required under federal, state or local regulations prior to site entry. Any personnel not able to satisfy this requirement will not be allowed to enter such work area(s), and no delay costs or other compensation will be paid to SUBCONSULTANT for failure to begin or continue the performance of Services due to inadequate personnel training.

8.9 Upon request, AMEC shall provide SUBCONSULTANT with any readings or measurements obtained by monitoring systems utilized for the safety of AMEC’s employees with regard to the Services. SUBCONSULTANT shall take such additional steps, readings or measurements as are necessary for performing the Services, and will be solely responsible to interpret all information provided by AMEC to determine all appropriate safety measures necessary to protect SUBCONSULTANT’s employees, agents, and sub-subconsultants. SUBCONSULTANT’s personnel shall employ at least that level of protection as is utilized by AMEC’s employees when within any controlled work area(s). Failure of SUBCONSULTANT to comply with this minimum level of protection will be grounds for denial of access to such controlled work area(s) by SUBCONSULTANT’s employees.

9.0 STANDARD OF PERFORMANCE
9.1 SUBCONSULTANT shall perform professional Services promptly, with due diligence and with that degree of skill and care ordinarily exercised by reputable members of SUBCONSULTANT’s profession practicing in the same or similar locality at the time the Services are performed. All non-professional Services, if applicable, will be performed free from faulty workmanship and defects in material and equipment.

9.2 Time is of the essence in this Agreement. SUBCONSULTANT shall diligently perform and complete all Services within the time limit specified in the applicable Work Order, or in a prompt and timely manner if no time limit is specified.

9.3 SUBCONSULTANT shall not infringe on the trademark, patent rights or other intellectual property of any person(s), corporation(s) or any other entity(ies) in the performance of the Services (“Infringement”).

9.4 If AMEC or CLIENT determines that the Services or any part thereof fail to meet SUBCONSULTANT’s standard of care described in Section 9.1, SUBCONSULTANT, upon notice of such deficiency, at its sole cost and expense, and without limiting other remedies available to AMEC and CLIENT, at the sole option of AMEC, shall either (i) correct the Services, at its expense, or (ii) pay the full cost for another subconsultant selected by AMEC and approved by CLIENT (if required by the Prime Agreement) to correct the Services. Should SUBCONSULTANT fail to commence and complete correction of defective Services to AMEC’s satisfaction within seven (7) calendar days of receipt of notice, AMEC and/or CLIENT may remedy the defects, as deemed necessary by AMEC and at SUBCONSULTANT’s expense, and offset the costs incurred thereby, including reasonable overhead, profit and attorneys’ fees, against amounts otherwise payable to SUBCONSULTANT or, if inadequate or no sums are otherwise payable, SUBCONSULTANT shall pay such costs within fifteen (15) days after receipt of AMEC’s invoice therefor.

9.5 SUBCONSULTANT will reimburse AMEC for all of AMEC’s costs, including reasonable attorney’s fees and expert’s fees, if AMEC must resort to litigation or dispute resolution to enforce the terms of this Agreement.

9.6 SUBCONSULTANT will not communicate about the Services directly with CLIENT.

10.0 INSURANCE AND BONDING

10.1 SUBCONTRACTOR shall, at its own expense, purchase and maintain insurance with insurance companies reasonably satisfactory to AMEC with minimum limits and coverages as follows:

10.1.1 Worker's Compensation Insurance in accordance with statutory requirements and Employers' Liability Insurance with limits of not less than $500,000 for each occurrence. If SUBCONTRACTOR is working near or on navigable waters, US Longshore & Haborworkers Compensation Act and Maritime coverage shall be provided. If leased or temporary employees are used, an alternate employer endorsement shall be provided to AMEC

10.1.2 Commercial General Liability Insurance with coverage limits of not less than $1,000,000.00 per occurrence and an aggregate of $2,000,000.00 on an "occurrence" basis for products and operation hazard, contractual liability, broad form liability, premises operations, property damage, independent consultants, personal injury, explosion, collapse and underground (X, C & U) where applicable.

10.1.3 Commercial Automobile Liability shall apply to all owned, non-owned, leased and hired vehicles, used by SUBCONTRACTOR, its employees, agents and subcontractors with limits of liability of not less than $1,000,000 combined single limit for bodily injury and Property Damage Liability. If SUBCONTRACTOR is a transporter of Waste Material, the commercial automobile liability insurance shall have an MCS-100 Endorsement.

10.1.4 Umbrella Liability, shall follow form and provide coverage with limits of not less than $1,000,000 per occurrence and $1,000,000 in the aggregate over the comprehensive general liability & automobile liability insurance requirements.

10.1.5 Pollution liability Insurance with limits of liability not less than $1,000,000 covering loss and liability arising out of or relating to Work that could result in or give rise to a contamination or pollution incident or condition. Insurance shall cover and include claims alleging bodily injury, property damage, or including claims alleging bodily injury, property damage or clean up which shall include investigation, response, removal, remediation and neutralization of the pollution condition both on and off site claims or to any other location to which Hazardous Materials/Regulated Substances were transported from the Site. Claims made coverage will not be acceptable.

10.1.6 Professional Liability Insurance with coverage limits of not less than $1,000,000 per claim and $2,000,000 in the aggregate, such aggregate limits shall be unimpaired, covering acts, errors, and omissions. If such policy is “claims made”, it shall remain in force continuously for three (3) years or an extended discovery period will be exercised for a period of three (3) years beginning from the time the work under this contract is completed. This policy must include coverage for a pollution event resulting from the professional services of Subcontractor.

10.1.7 If marine work is to be performed by SUBCONTRACTOR or any third party (subconsultant, charterer, etc.) retained by SUBCONTRACTOR, the entity furnishing the vessel shall be required to maintain, (a) Protection and Indemnity Insurance, including coverage for injuries to or death of masters, mates and crews of vessels used in the performance of the Agreement, Jones Act for employees performing services covered by the Act (b) Coverage for excess collision liabilities and pollution liabilities which shall include coverage for bodily injury (including death and mental anguish), property damage, defense costs and cleanup costs in an amount not less than $10,000,000 per occurrence and aggregate and (c) Hull Insurance in an amount equal to the full value of the vessel. AMEC and CLIENT must be named as an additional insured on the P&I, excess and pollution policies, which coverage shall be primary and non-contributing. A waiver of subrogation in favor of AMEC and CLIENT is required.

Rev. 1/1/2012
© 2000-2012 AMEC This agreement and its terms should not be used for any purpose except as expressly consented to in writing by AMEC.
10.1.8 If the work involves aircraft (fixed wing or helicopter) owned, operated or chartered by the SUBCONSULTANT, per 10.1.1 (vi), liability arising out of such aircraft shall be insured for a combined single limit not less than $10,000,000 each occurrence and such limit shall apply to Bodily Injury (including passengers) and Property Damage Liability. Such insurance shall name AMEC and CLIENT as Additional Insureds, include an Insurer’s waiver of subrogation in favor of the Additional Insureds, state that is primary insurance as regards the Additional Insureds and contain a cross-liability or severability of interest clause. If the aircraft hull is insured such insurance shall provide for an insurer’s waiver of subrogation rights in favor of AMEC and CLIENT and their subsidiaries and affiliates. In the event SUBCONSULTANT charters aircraft, the foregoing insurance and evidence of insurance may be furnished by the owner of the chartered aircraft, provided the above requirements are met.

10.2 Prior to performing any Work, SUBCONTRACTOR shall furnish AMEC with original Certificates of Insurance certifying that all insurance required under this Agreement is in full force and effect, citing the expiration date of each policy and stating that the insurance will not be non-renewed or cancelled during the term of this Agreement without thirty (30) calendar days prior written notice to AMEC; provided, that ten (10) Business Days notice is acceptable for cancellation due to nonpayment of premiums.

10.3 The policies described in 10.1 shall be endorsed to provide for a waiver of subrogation rights in favor of AMEC and CLIENT where permissible by state law. AMEC and CLIENT shall be included as additional insureds on the policies described in 10.1.2 and 10.1.4 by ISO endorsement CG 2010 10/01 & its companion 2037 10/01 or their equivalent. AMEC and CLIENT shall be included as additional insureds on the policies described in 10.1.3, 10.1.5, 10.1.7, 10.1.8. Additional insured forms must be identified on the certificate and such policies shall be primary and non-contributing with policies of AMEC and CLIENT. Each policy shall contain a severability of interest clause with respect to each additional insured. Receipt by AMEC of the Certificates of Insurance required herein shall be a prerequisite to commencement of, and payment for, the Work.

10.4 SUBCONTRACTOR shall bear all risk of loss, theft, damage or destruction to (i) property in its care, custody or control that is provided to SUBCONTRACTOR by AMEC or CLIENT under any Work Order and (ii) SUBCONTRACTOR’s equipment, appliances, tools, facilities, and temporary materials necessary to perform the Work. At all times and at SUBCONTRACTOR’s expense, SUBCONTRACTOR shall maintain insurance against such loss, theft, damage or destruction in an amount not less than the replacement value of all such items. SUBCONTRACTOR waives subrogation rights against AMEC for damage to, or destruction of, SUBCONTRACTOR’s property, materials, vehicles and equipment.

10.4.1 If a builder’s risk policy has been put in place for the project, SUBCONTRACTOR shall not bear the risk of the builders risk policy except for the deductible for any damages the SUBCONTRACTOR is responsible for.

10.5 AMEC may require additional coverages or higher limits of liability for a particular scope of Work or as required by CLIENT. Such additional coverage or higher limits, if any, will be identified in the particular Work Order.

10.6 Each of SUBCONTRACTOR’s insurance providers shall have an A.M. Best’s Key Rating of at least A: VIII and be authorized or licensed to conduct business where the Work is to be performed. Any and all deductibles and/or self-insured retentions in the above-described insurance policies shall be assumed by, for the account of, and at the sole risk of SUBCONTRACTOR.

10.7 The SUBCONTRACTOR shall cause all insurances to be in full force and effect as of the date of execution of this Agreement and to remain in full force and effect throughout the term of this Agreement and shall remain in effect for three (3) years post completion or as further required by the prime agreement. The Consultant shall not take any action, or omit to take any action that would suspend or invalidate any of the required coverages during the time period such coverages are required to be in effect. All requirements herein provided shall appear either in the body of the insurance policies or as endorsements and shall specifically bind the insurance carrier. No policy shall be “claims made” unless so stated in 10.1. AMEC reserves the right to request insurance policies as they deem necessary.

10.8 Failure by SUBCONTRACTOR to maintain the required insurance or to provide evidence thereof reasonably acceptable to AMEC shall constitute a material breach of this Agreement, upon which AMEC may immediately suspend performance of or terminate this Agreement in accordance with Article 14.0. Alternatively, AMEC may purchase such required insurance coverage, and offset the cost thereof against any compensation due SUBCONTRACTOR. The insolvent, bankruptcy, receivership or failure of any insurance company to pay all claims accruing thereunder shall not relieve SUBCONTRACTOR of any of its obligations herein.

10.9 The provision of insurance by SUBCONTRACTOR pursuant to this Article 10.0 does not limit SUBCONTRACTOR’s responsibility to AMEC, nor does failure of AMEC to demand a certificate of insurance or other evidence of full compliance with these insurance requirements or failure of AMEC to identify a deficiency from evidence that is provided to meet these Article 10.0 requirements constitute a waiver of the requirements.

10.10 All coverages for lower tiered subcontractors shall be subject to all of the limits, terms and requirements stated herein.

10.12 From time-to-time, SUBCONTRACTOR may be required to provide one hundred percent (100%) performance and payment bonds in connection with a particular Work Order. If such bond(s) is required by AMEC or CLIENT, (i) SUBCONTRACTOR will be notified in advance to allow adequate time to secure the bond(s) or reject the Work Order, (ii) the surety company providing the bond(s) must be a “treasury listed” company and (iii) AMEC will expressly require such bond(s) in the applicable Work Order. If SUBCONTRACTOR’s proposal is a lump sum fixed price proposal, it will be conclusively presumed that the cost of the surety bond(s) is included in the lump sum price. If the proposal is not lump sum fixed price, AMEC will treat the actual cost of any such required surety bond(s) as a “reimbursable cost”.

11.0 INDEMNIFICATION

11.1 For separate consideration received from AMEC in the amount of $10.00, SUBCONSULTANT shall release, defend,
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indemnify and save harmless AMEC and CLIENT as provided below:

11.1.1 SUBCONSULTANT shall defend, indemnify and hold harmless CLIENT and all of its parent companies, subsidiaries, affiliates and subconsultants, including their respective officers, directors, employees, principals, partners, agents, successors and assigns (collectively, “CLIENT Indemnitees”), either directly or indirectly through AMEC, in accordance with, and to the same extent required by, the obligations to defend, indemnify and hold harmless CLIENT which are required of AMEC in the Prime Agreement, including, without limitation, CLIENT’s obligations, if any, to defend, indemnify and hold other parties harmless.

11.1.2 SUBCONSULTANT shall defend, indemnify and hold harmless AMEC and all of its parent companies, subsidiaries, affiliates and subconsultants, including their respective officers, directors, employees, principals, partners, agents, successors and assigns (collectively, “AMEC Indemnitees”) from and against any and all claims that may be brought or made against AMEC Indemnitees on account of Infringement, liabilities, damages (including, without limitation, damage to subterranean structures, involvement with waste or exposure to, or the release of, toxic or hazardous substances and damages attributable to bodily injury (including death), personal injury and property damage), losses, costs, expenses, settlements, judgments, awards, and governmental penalties and sanctions, and reasonable attorneys’ and experts’ fees, (sometimes individually, “Claim” and, sometimes collectively, “Claims”), caused by, arising out of, or contributed to by any actual or alleged breach of the terms of this Agreement include any Claims made against AMEC by or for SUBCONSULTANT under workers’ compensation acts, or other employee benefit acts.

11.2 SUBCONSULTANT’s indemnity obligations contained in this Agreement include any Claims made against AMEC by SUBCONSULTANT’s employees, except to the extent Claims arise from the negligence of AMEC; provided, that the foregoing exception shall not apply to the extent that AMEC otherwise would be exposed to an aggregate liability that would exceed any limitation on the amount or type of damages, compensation or benefits payable by or for SUBCONSULTANT under workers’ compensation acts, disability benefits acts, or other employee benefit acts.

12.0 ASSIGNMENT

12.1 SUBCONSULTANT shall not assign this Agreement, or any amounts due or to become due under this Agreement or any Work Order, without the prior written consent of AMEC and shall not subcontract the whole or any part of the Services without the prior written consent of AMEC. Notwithstanding AMEC’s consent to an assignment of this Agreement, SUBCONSULTANT will remain liable to AMEC for any assignee’s performance or lack thereof.

12.2 Should SUBCONSULTANT wish to subcontract any portion of this Agreement or the Services, SUBCONSULTANT shall provide the name and address of all such sub-subconsultants to AMEC for AMEC’s consent, which AMEC will not unreasonably withhold.

13.0 CONFIDENTIALITY

13.1 SUBCONSULTANT will ensure that its personnel will maintain the confidentiality of all documents and information that are provided to SUBCONSULTANT by AMEC or CLIENT, or both, with respect to each project and the Services, as well as all information, test results, reports and analyses generated by SUBCONSULTANT as part of the Services (collectively, “Confidential Information”). SUBCONSULTANT shall by contract or published policy require that its personnel not reveal any Confidential Information, including, but not limited to, the nature or results of the Services performed, to any party other than AMEC or CLIENT without prior written consent of AMEC or CLIENT, or both, as applicable, and shall direct all comments or questions only to AMEC’s project manager.

14.0 TERMINATION

14.1 AMEC shall have the right to terminate this Agreement and all Work Orders, or any Work Orders without terminating this Agreement, for cause when AMEC determines that SUBCONSULTANT has failed to perform any Services in a proper or timely manner or is otherwise in breach of a material obligation of this Agreement or any Work Order, provided that AMEC has given SUBCONSULTANT written notice of the failure or breach and SUBCONSULTANT has failed to cure the same to AMEC’s satisfaction within seven (7) calendar days after receipt of such notice. In the event of such termination, AMEC shall have the right to complete the Services itself, or use another subconsultant, and SUBCONSULTANT shall reimburse AMEC for all such resulting expenses, including reasonable overhead, profit and attorneys’ fees.

In the event that AMEC’s effort to terminate for cause is determined to be ineffective or improper for any reason whatsoever, such notice shall be deemed to be a notice of termination for convenience under Section 14.2 below.

14.2 AMEC may terminate this Agreement and all Work Orders, or any Work Orders without terminating this Agreement, for convenience and without cause, upon written notice. In such event, AMEC shall pay SUBCONSULTANT for Services satisfactorily completed prior to the date of termination, and not previously compensated, in accordance with this Agreement and the Work Order or Work Orders which are being terminated.

14.3 Upon notice of termination, SUBCONSULTANT shall cease performance of all Services under those Work Orders referenced in the notice of termination and shall promptly remove all of its equipment and personnel from each project site for which the applicable Work Order has been terminated. SUBCONSULTANT shall not be entitled to payment for any Services performed after the effective date of termination.

14.4 Neither AMEC nor CLIENT shall be liable for anticipated profits or for economic, incidental or consequential damages to the other party arising out of breach of contract, termination, or for any other reason whatsoever.

15.0 INDEPENDENT CONTRACTOR

15.1 SUBCONSULTANT is an independent contractor, and the means, manner and method of performing the Services are under the exclusive control of SUBCONSULTANT. SUBCONSULTANT shall not be deemed an employee or agent of AMEC for any purpose. As an independent contractor, neither
16.0 LAWS AND REGULATIONS

16.1 Except as otherwise set forth in a Work Order, SUBCONSULTANT shall pay all prevailing wages and taxes, to the extent applicable, and obtain and pay for all permits, fees and licenses, and provide all notifications, required by local, county, state, or federal agencies, which are necessary for the execution of this Agreement and all Work Orders and the proper completion of all Services. SUBCONSULTANT shall comply with all applicable Laws at all times.

16.2 SUBCONSULTANT shall comply with Executive Order 11246 relating to Equal Employment Opportunity and such other non-discriminatory and affirmative action obligations that are included in the Prime Agreement, such obligations being hereby incorporated and made a part of this Agreement by reference to its applicable parts.

16.3 The Equal Opportunity and Affirmative Action clauses of 41 CFR 60-1.4, 60-250.4 and 60-741.4 are hereby incorporated by reference to the extent applicable to the Services. SUBCONSULTANT agrees to take the following actions as appropriate to the Services: File SF-100 (EE0-1) compliance report (41CFR 60-1.7), certify absence of segregated facilities (41 CFR 60-1.8), prepare or show proof of written Affirmative Action Program (41 CFR 60-1.40, 60-250.5, 60-751.5) or otherwise comply with all applicable government requirements.

17.0 OWNERSHIP AND USE OF TECHNICAL AND OTHER DATA, COMPUTER SOFTWARE, ETC.

17.1 All copyrights, patents, drawings, sketches, surveys, designs, computer software, programs, manuals, data specifications, notebooks, technical and scientific data, and all photographs, negatives, reports, findings, recommendations, data and memoranda of every description relating thereto, as well as all copies of the foregoing, and any and all instruments of service or products (including all software) prepared or obtained pursuant to the Services shall be the exclusive property of AMEC, together with all accompanying rights of ownership, as works for hire without any claim on the part of SUBCONSULTANT for additional compensation; provided, that SUBCONSULTANT may use the foregoing in the performance of Services for the Federal Government to the extent that the Federal Government has the right to authorize such use in either (i) a provision(s) in the Prime Agreement or (ii) a flow-down provision(s) in a prime agreement with a third party to which AMEC and its subconsultants are subject. SUBCONSULTANT may not retain copies of the foregoing after completion of the Services, aside from one confidential file copy for its records, without AMEC’s prior written consent.

17.2 AMEC may use or re-use the materials and items mentioned in Section 17.1 above without restriction for the project or purpose for which the Services were performed.

17.3 SUBCONSULTANT shall defend, indemnify and hold harmless AMEC Indemnities and CLIENT Indemnities from and against any and all Claims of infringement of any patents, copyrights, trademarks or trade secrets relating to the Services, except Claims that result from SUBCONSULTANT’s compliance with any designs, specifications or instructions received from AMEC.

(SECTIONS 18 AND 19 ARE ONLY APPLICABLE IF INVASIVE, DESTRUCTIVE TESTING OR LABORATORY SERVICES ARE INCLUDED IN THE SCOPE OF SERVICES IN ANY WORK ORDER.)

18.0 WASTES

18.1 Except as otherwise expressly required by the Prime Agreement or a Work Order, to title to all Samples (hereinafter defined), by-products, residue or hazardous soils or materials, drill cuttings, drilling fluids and other similar materials (collectively, “Wastes”) shall remain with CLIENT or owner of the project site or facility from which they were taken (“Owner”) if different from CLIENT.

18.2 SUBCONSULTANT will appropriately and adequately contain and label all Wastes and will promptly notify AMEC that such containerization and labeling have been performed. Unless otherwise stated in the applicable Work Order, the costs to perform these Services shall be deemed to have been included in SUBCONSULTANT’s initial price for the Services under that Work Order.

18.3 SUBCONSULTANT shall handle all Wastes properly at all times, irrespective of the disposition of title. AMEC or SUBCONSULTANT will be acting solely as an independent contractor for CLIENT if either arranges for and coordinates the removal, transport and disposal of Wastes. At no time will AMEC take title, constructive or express, to any Wastes.

18.4 SUBCONSULTANT shall store and dispose of all Wastes resulting from the Services (i) as required by the Prime Agreement or the Work Order under which the applicable Services are to be performed and (ii) in accordance with all applicable Laws and under proper manifest, if required. Upon completion of the disposal, SUBCONSULTANT shall provide the Technical Representative and CLIENT with a fully and properly executed affidavit or such other sworn or affirmed indication in writing, confirming proper disposal of such Wastes.

19.0 ANALYTICAL REQUIREMENTS AND SAMPLES

19.1 SUBCONSULTANT shall sample, test and analyze all specimens, representative pieces, segments, fluids or the like and residue therefrom (individually, “Sample” and, collectively, “Samples”) in accordance with the safety and other applicable requirements of the Prime Agreement, as well as all applicable United States Environmental Protection Agency and other applicable Laws, standards and requirements. SUBCONSULTANT shall be solely responsible for the means and methods used to perform all sampling, testing and analyses. Laboratory Services shall be provided by SUBCONSULTANT in full compliance, and in a manner consistent, with any additional quality requirements of the project as described in the applicable Work Order. AMEC may visit SUBCONSULTANT’s facility during normal business hours to perform a quality compliance audit to evaluate SUBCONSULTANT’s ability to meet project quality requirements.
The inability of SUBCONSULTANT to satisfy project quality requirements shall be sufficient cause for AMEC to terminate this Agreement and all Work Orders, or any Work Orders without terminating this Agreement, for cause in accordance with Article 14.0 above.

19.2 Except as otherwise expressly required by the Prime Agreement or a Work Order, title to all Samples shall remain with CLIENT or Owner if different from CLIENT. However, if title is to pass from CLIENT or Owner, if it is to pass at all, by virtue of either the Prime Agreement or a Work Order, it will pass directly to SUBCONSULTANT, in which event SUBCONSULTANT will take title to all Samples when received. SUBCONSULTANT shall properly handle and dispose of all Samples at all times, irrespective of the disposition of title. SUBCONSULTANT will be acting solely as an independent contractor for CLIENT if it arranges for and coordinates the transport and disposal of Samples. At no time will AMEC take title, constructive or express, to any Samples. Upon completion of the Services, SUBCONSULTANT shall provide the Technical Representative and CLIENT with a fully and properly executed affidavit in the form attached hereto as Exhibit "F", or other sworn or affirmed indication in writing confirming proper disposal of such Samples.

19.2.1 SUBCONSULTANT shall contact AMEC immediately upon receipt of Samples and will advise AMEC of any discrepancies between the included chain-of-custody form(s) and Samples received, or of any evidence of damage or tampering with any seals or Samples.

19.2.2 For each Sample analyzed and for all test methods, SUBCONSULTANT must list all data in the format specified by the applicable Work Order.

19.3 SUBCONSULTANT shall perform all analyses requested and provide deliverables described in this Agreement and in the applicable Work Order.

19.3.1 The "valid date of receipt" for a Sample shall be defined as the date that the first valid, physical Sample and all of its associated, accurately-completed documentation have been delivered to the laboratory ("Valid Receipt Date"). At the completion of each lot assignment, the analysis due date stipulated by the applicable Work Order for any given lot ("Due Date") shall be calculated based on the Valid Receipt Date of the last Sample received in a lotting period or within ten (10) calendar days after the Valid Receipt Date of the first Sample for an expedited turnaround. Thereafter, without waiving or limiting any other claims or damages that AMEC may have, failure to supply the specified final deliverables by the applicable Due Date will result in the following penalties:

(i) An additional charge of ten percent (10%) of the total lot price for data deliverables shall be assessed for each consecutive seven (7) day period by which SUBCONSULTANT fails to meet the applicable, non-expedited Due Date, and

(ii) Additionally, for expedited turnaround-time requests for which AMEC has agreed to pay a stipulated surcharge, SUBCONSULTANT shall forfeit the entire surcharge for those lots for which delivery exceeds the expedited Due Date.

(iii) Total penalties assessed against any one lot shall not exceed the total price of such lot.

19.3.2 If a Sample matrix can be demonstrated to be incompatible with the standard method analysis requested, the Technical Representative may waive all resultant penalties in writing.

19.4 SUBCONSULTANT shall be responsible for the preservation and handling of all Samples that it takes from a project site or receives from AMEC. SUBCONSULTANT shall timely provide for its own use, or to AMEC if AMEC is collecting the Samples, all necessary sampling supplies including, but not limited to, shipping containers, Sample containers, appropriate preservatives, coolers, custody seals, and chain of custody forms and documents. SUBCONSULTANT shall ensure that all Samples are timely and safely transported. SUBCONSULTANT shall provide all equipment and supplies needed for it to perform the Services. Any such supplies required to be provided by AMEC due to late or non-delivery shall be at SUBCONSULTANT’s expense; provided, that SUBCONSULTANT shall not be liable for delays beyond its reasonable control.

19.5 SUBCONSULTANT will retain any unconsumed quantity of Samples for a period of at least thirty (30) calendar days after receipt by AMEC of the final data report from SUBCONSULTANT, at no additional charge, and, if requested, for such additional time at a reasonable storage charge as the parties may agree. At the end of either the thirty (30) calendar days or any additional storage period, SUBCONSULTANT will dispose of any unconsumed Samples(s) in accordance with all applicable Laws and otherwise as set forth in Section 19.2 above.

19.6 SUBCONSULTANT shall be fully and solely responsible and liable for the integrity, preservation and spoilage of, and all contamination to or from, all Samples it takes, transports and/or tests in the field or in its laboratory. SUBCONSULTANT shall be solely responsible for all costs and expenses of SUBCONSULTANT, AMEC and CLIENT for retaking or re-testing of Samples, the need for which results from SUBCONSULTANT’s non-compliance with the requirements set forth in the immediately preceding sentence. SUBCONSULTANT’s obligations of indemnification under Article 11.0 above include, but are not limited to, reperformance of any analytical procedures that fail to meet the quality requirements set forth in this Agreement and the applicable Work Order, at no additional cost to AMEC, and reimbursement of AMEC for all reasonable costs incurred in obtaining additional Samples, unless appropriate, unused Samples that remain are still within allowable hold times.

20.0 NOTICES

20.1 Except as provided elsewhere in this Agreement, any notice required to be given under this Agreement shall be provided in writing and posted by certified U.S. mail, return receipt requested, or sent via overnight courier to the Contractual Representative at the following address:

AMEC Environment & Infrastructure, Inc.

{ENTER STREET ADDRESS HERE}

{ENTER CITY, STATE AND ZIP CODE HERE}

{ENTER NAME OF SUBCONSULTANT HERE}
20.2 Notices shall be deemed received the day delivery is either made or refused, if sent by certified mail, or upon delivery, if sent via overnight courier.

21.0 SURVIVAL

21.1 All of SUBCONSULTANT’s obligations and liabilities hereunder, including, but not limited to, its warranty and indemnification obligations and AMEC’s rights and remedies with respect thereto, shall survive the expiration or termination of this Agreement and the Work Orders.

22.0 TERM

22.1 This Agreement shall continue in force until [ENTER MONTH AND DAY HERE], 20[0-9] , or for one (1) year from the date first set forth above if no date is specified, unless terminated earlier by mutual agreement or as described herein.

23.0 NO WAIVER

22.1 No waiver by either party of any right or remedy with respect to any occurrence or event on one occasion shall be deemed a waiver of such right or remedy with respect to such occurrence on any other occasion.

24.0 SEVERABILITY

24.1 To the extent any provision of this Agreement is unlawful or unenforceable, that provision shall be ineffective without affecting any other provision of this Agreement, so that the balance of this Agreement will be deemed to be a valid and binding agreement which is enforceable in accordance with its terms.

25.0 HEADINGS

25.1 The headings used in this Agreement are for the purpose of convenience only and are not to be used or referred to in interpreting the meaning or the terms of this Agreement.

26.0 CHOICE OF LAW

26.1 This Agreement is to be construed according to the same Laws that govern the Prime Agreement, or, in the absence of such a governing law provision in the Prime Agreement, according to the Laws of the state in which the project site is located, exclusive of its choice of law provisions.

27.0 DISPUTE RESOLUTION

27.1 The parties shall undertake in good faith to settle or compromise all disputes, controversies, or differences that may arise between them out of the performance of a party and which arise out of or relate to this Agreement (individually, “Dispute” and, collectively, “Disputes”) by means of amicable discussions. Except as otherwise expressly required by the Prime Agreement, all Disputes shall be dealt with as follows:

(i) Any time there is a Dispute, either party may send a written notice to the other party setting forth a detailed description of the Dispute (“Notice of Dispute”). If the Dispute is not resolved during the first fourteen (14) days following receipt of the Notice of Dispute, either party may seek to have the Dispute resolved by non-binding mediation pursuant to the Construction Industry Mediation Rules of the American Arbitration Association. Promptly upon selection of a mediator, the parties shall provide the mediator with copies of the Notice of Dispute, all related, relevant documents and a statement of their respective positions and shall request that the mediator meet with the parties within twenty (20) days of such selection to consider and propose a resolution or a procedure for reaching a resolution.

(ii) If the parties have not resolved the Dispute or have not agreed in a writing signed by an officer of both parties to resolve the Dispute by binding arbitration, either party, after sixty (60) days following receipt of the Notice of Dispute (regardless of whether any mediation process has occurred or is ongoing or concluded), may seek a resolution in any state or federal court that has jurisdiction over the parties and the subject matter of the Dispute (“Court”). Either party may apply to a Court for an order, if necessary, granting preliminary relief to maintain the status quo, to avoid irreparable injury, or to obtain other emergency relief at any time during the process described above. Despite such application, the parties will continue to participate in good faith in the procedures specified in this Section 27.1.

27.2 The procedures specified in this Article 26.0 shall be the sole and exclusive procedures for the resolution of Disputes. TO THE EXTENT NOT PROHIBITED BY LAW, THE PARTIES HEREBY WAIVE TRIAL BY JURY WITH RESPECT TO ANY ACTION OR PROCEEDING BROUGHT IN CONNECTION WITH THIS AGREEMENT.

28.0 BRIBERY AND CORRUPTION PROHIBITED

28.1 SUBCONSULTANT will undertake to protect the standards of business practice of AMEC at all times and to act in such a way as to uphold AMEC’s good name and reputation and not to do or attempt to do any act or thing which is intended and/or which in fact causes any damage to or brings discredit upon AMEC. In particular, SUBCONSULTANT shall not, directly or indirectly:

(i) Offer or give or agree to give to any director, officer, employee, or agent of AMEC or CLIENT any gift or consideration of any kind as an inducement or reward for doing or for forbearing to do or for having done or forborne to do any action in relation to the obtaining or execution of this Agreement, the Prime Agreement, or any other agreement with AMEC or CLIENT or for showing or forbearing to show any favor or disfavor to any person in relation to this Agreement, the Prime Agreement, or any other agreement with AMEC or CLIENT.

(ii) Induce or attempt to induce any officer, servant, employee, or agent of any private or public body to depart from his or her duties to his or her employer nor be involved with any such arrangement.
28.2 SUBCONSULTANT agrees to review and comply with AMEC’s Supplier Code of Business Conduct at www.amec.com/supply-chain-cobc.htm. SUBCONSULTANT shall report any potential, suspected or actual breaches of the law or AMEC’s Supplier Code of Business Conduct via the website.

29.0 AMENDMENTS

29.1 This Agreement may be amended only by a written instrument executed by both parties which specifically refers to, and states that it amends, this Agreement. In the instance of AMEC, each such amendment must be signed by the Contractual Representative.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first written.

AMEC
AMEC Environment & Infrastructure, Inc.

Signature of Authorized Contractual Representative
Printed Name
Title

SUBCONTRACTOR

{INSERT LEGAL NAME OF SUBCONTRACTOR HERE}

Signature of Authorized Subcontractor Representative
Printed Name
Title

30.0 ENTIRE AGREEMENT

30.1 This Agreement, the drawings and specifications provided by AMEC to SUBCONSULTANT, all Exhibits and the Work Orders represent the entire agreement of the parties, and supersede all prior or contemporaneous communications, representations, agreements or understandings, whether written or oral, relating to the subject matter of this Agreement, including any and all terms and conditions which are set forth, by attachment, reference or otherwise, in SUBCONSULTANT’s proposal which hereby are superseded. Any additional or different terms or conditions that may appear in any communication from, or form used by, SUBCONSULTANT (e.g. chain of custody form) with respect to the Services shall be of no effect and shall not amend this Agreement, even if signed by AMEC.
**SUBCONTRACT WORK ORDER**

| To: {ENTER NAME HERE} | AMEC WORK ORDER & PO NO.: {ENTER NUMBER HERE} |
| {ENTER ADDRESS HERE} | AMEC PROJECT NAME: {ENTER NAME HERE} |
| {ENTER ADDRESS HERE} | AMEC PROJECT NO.: {ENTER NUMBER HERE} |
| {ENTER ADDRESS HERE} | DATE ISSUED: {ENTER MONTH, DATE & YEAR HERE} |

**INSTRUCTIONS TO SUBCONTRACTOR/SUBCONSULTANT:**

All invoices and correspondence must identify the name of the SUBCONTRACTOR/SUBCONSULTANT and contain the name of the AMEC Environment & Infrastructure, Inc. (“AMEC”) office requesting the Work/Services as well as AMEC’s Project Name, Project No. and Work Order & PO No. Invoices must be received by AMEC within thirty (30) days of performing the Work/Services and sent to AMEC either by hardcopy or electronically to the following address:

{Enter Billing Address Here}

{Enter Billing City, State, Zip}

Attn:

Email:

SUBCONTRACTOR/SUBCONSULTANT shall perform the work/services described in this Work Order (“Work/Services”) for the benefit of AMEC and {Insert legal name of Client} (“Client”) in accordance with the terms and conditions contained in that certain Subcontract Agreement {Insert Agreement Number} between AMEC and SUBCONTRACTOR/SUBCONSULTANT dated {Enter date of Agreement} and any amendments thereto (collectively, “Agreement”), including, without limitation, the Prime Agreement between AMEC and Client which is attached hereto as Attachment 1 and incorporated herein by reference.

This Subcontract Work Order directly or indirectly supports Federal Government Contract: ☐ Yes ☐ No. If Yes, Contract No. ______, DPAS No. ______.

**REPRESENTATIVES:**

Work Order Contractual Representative: {ENTER BUYER NAME HERE}

Technical Representative: {ENTER TECHNICAL REP HERE}

**SCOPE OF WORK/SERVICES:**

SUBCONTRACTOR/SUBCONSULTANT shall perform the Work/Services which, if not set forth immediately below, is/are set forth on Attachment “2” hereto in accordance with the Drawings and Specifications provided by AMEC, as set forth on Attachment “3” hereto, as applicable, both of which are incorporated herein. Among other things, the Work/Services will address coordination and other areas relevant to, and appropriate for, the proper performance of the Services.

{Insert Scope}

**SCHEDULE:**

SUBCONTRACTOR/SUBCONSULTANT shall perform the Work/Services and deliver the work product in accordance with the Performance Schedule which, if not set forth immediately below, is set forth on Attachment “4” hereto and incorporated herein.

{Insert Schedule}

**PRICE:**

Upon satisfactory completion of the Work/Services, AMEC shall pay and SUBCONTRACTOR/SUBCONSULTANT shall accept the following as full compensation for the Work/Services:

☐ The Not-to-Exceed Cost Reimbursement for the Work/Services, which is {Enter written amount here} (${Enter figure here}).

☐ The Not-to-Exceed Firm Fixed Price for the Work/Services, which is {Enter written amount here} (${Enter figure here}).

☐ The Not-to-Exceed Time & Materials Price for the Work/Services, which is {Enter written amount here} (${Enter figure here}).

☐ The Not-to-Exceed Fixed Unit Price for the Work/Services, which is {Enter written amount here} (${Enter figure here}).

If the compensation is based upon a Price/Fee Schedule, applicable billing rates are set forth in Attachment “5” hereto and incorporated herein. Any deviation from the above price must be authorized by an executed Subcontract Change Order signed by the Work Order Contractual Representative listed above.

**FINAL LIEN RELEASE:**

A Final Lien Release must accompany the SUBCONTRACTOR/SUBCONSULTANT’s final invoice: ☐ Yes ☐ No

**INSURANCE:**
SUBCONTRACTOR/SUBCONSULTANT will not commence Work/Services until it provides AMEC with a certificate evidencing all insurance coverages required of it. The insurance requirements in the Agreement are modified as follows for the Work/Services set forth on Attachments 2 and 3 hereto: ☐ No Changes ☐

**BONDS:**

☐ Not required.

☐ SUBCONTRACTOR/SUBCONSULTANT shall secure and maintain the following surety bonds before commencing Work/Services: {Enter description here}.

**OTHER:**

By their signatures below, the parties acknowledge that they shall be bound by the terms of this Subcontract Work Order, including the attachments hereto, and that the undersigned are authorized to enter into this Subcontract Work Order.

**SUBCONTRACTOR/SUBCONSULTANT**

By _________________________________

Print Name _________________________________

Title _________________________________

Date _________________________________

**AMEC Environment & Infrastructure, Inc.**

By _________________________________

Print Name _________________________________

Title _________________________________

Date _________________________________

Exhibit “A”
## SUBCONTRACT CHANGE ORDER

| To: {ENTER NAME HERE} | AMEC WORK ORDER & PO NO.: {ENTER NUMBER HERE} |
| {ENTER ADDRESS HERE} | AMEC PROJECT NAME: {ENTER NAME HERE} |
| {ENTER ADDRESS HERE} | AMEC PROJECT NO.: {ENTER NUMBER HERE} |
| {ENTER ADDRESS HERE} | DATE ISSUED: {ENTER MONTH, DATE & YEAR HERE} |
| CHANGE NO.: {ENTER NUMBER HERE} |

In accordance with the terms and conditions contained in that certain Subcontract Agreement {Insert Agreement Number} between AMEC Environment & Infrastructure, Inc. (“AMEC) and SUBCONTRACTOR/SUBCONSULTANT dated {Enter date of Agreement}, and any amendments thereto (collectively, “Agreement”), the above-referenced Work Order (“Work Order”) issued pursuant to the Agreement is hereby changed only as follows:

### CHANGE(S) IN WORK/SERVICES:
- [ ] No change in SUBCONTRACTOR’s/SUBCONSULTANT’s Work/Services.
- [ ] SUBCONTRACTOR’s/SUBCONSULTANT’s Work/Services have been changed as follows: {Insert description of changes. As needed, reference and attach any applicable documents, including a revised Attachment "2" or "3" (or both) to the Work Order, as applicable.}

### CHANGE IN SCHEDULE:
- [ ] No change in SUBCONTRACTOR’s/SUBCONSULTANT’s time for completion of the Work/Services.
- [ ] SUBCONTRACTOR’s/SUBCONSULTANT’s time for completion of the Work/Services has been changed as follows: {Insert description of changes. As needed, reference and attach applicable documents, including a revised Attachment "4" to the Work Order, as applicable.}

### CHANGE IN COMPENSATION:
- [ ] No change in the amount of SUBCONTRACTOR’s/SUBCONSULTANT’s compensation for the Work/Services.
- [ ] The compensation of SUBCONTRACTOR/SUBCONSULTANT for the Work/Services is hereby adjusted as follows: {Insert amount and/or basis upon which compensation will be adjusted. As needed, reference and attach any applicable documents, including a revised Attachment "5" to the Work Order, as applicable.}

| Original Agreement/ceiling amount: | $___ |
| Current Agreement amount, as adjusted by previous Change Orders: | $___ |
| Increase or decrease resulting from this Change Order: | $___ |
| Revised Agreement/ceiling amount: | $___ |

### FINAL LIEN RELEASE:
A Final Lien Release must accompany the SUBCONTRACTOR/SUBCONSULTANT’s final invoice: [ ] Yes [ ] No

### OTHER CHANGES:
- [ ] No other changes.
- [ ] {Insert description of other changes}

This Subcontract Change Order shall become an amendment to the above-referenced Work Order, and all Work/Services covered by this Subcontract Change Order will be performed under the terms of the Agreement.

### SUBCONTRACTOR/SUBCONSULTANT
By ________________________________
Print Name ________________________________
Title ________________________________
Date ________________________________

### Attachments:
{List any attachments}

Exhibit “B”
### Subcontract Work Order Closeout Form and Lien Release

<table>
<thead>
<tr>
<th>Agreement #: {Insert Number}</th>
<th>Client: {Insert Name}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subcontract Work Order &amp; PO #: {Insert Number}</td>
<td>AMEC Project Name: {Insert Name}</td>
</tr>
<tr>
<td>Subcontract Change Order #: {Insert Number}</td>
<td>AMEC Project #: {Insert Number}</td>
</tr>
</tbody>
</table>

**INSTRUCTIONS:** This document must be completed and submitted together with the SUBCONTRACTOR’s/SUBCONSULTANT’s final invoice. Failure to properly comply with this requirement shall delay processing of the SUBCONTRACTOR’s/SUBCONSULTANT’s final payment. Final invoices not submitted within thirty (30) days of completion of the applicable work and/or services shall be subject to rejection.

In accordance with and pursuant to the terms and conditions of the above-referenced Subcontract, Subcontract Work Order and Subcontract Change Order, as applicable, (collectively, “Subcontract Documents”), by submission of this document, the SUBCONTRACTOR/SUBCONSULTANT herewith acknowledges and agrees that:

- All work and/or services pertaining to the above-referenced Subcontract Work Order and applicable Change Order, if any, has been completed in a satisfactory manner as required by the Subcontract Documents.
- Any property furnished to the SUBCONTRACTOR/SUBCONSULTANT by AMEC Environment & Infrastructure, Inc.? (“AMEC”) and/or its Client has been returned and/or dispositioned as directed by AMEC.
- All work and/or services performed by the SUBCONTRACTOR/SUBCONSULTANT, or any of its officers, agents, employees or subcontractors, is free from any claim(s) of patent, copyright, and/or trademark and service mark infringement.
- All previous payments and SUBCONTRACTOR’s/SUBCONSULTANT’s final invoice, when paid, fully satisfy AMEC’s obligations to the SUBCONTRACTOR/SUBCONSULTANT with regard to compensation due it under the terms of the Subcontract Documents for the performance of work and/or services on the above-referenced Project, and the SUBCONTRACTOR/SUBCONSULTANT has paid or will pay in a timely manner all of its obligations arising out of such performance.
- Upon payment of the final invoice, the SUBCONTRACTOR/SUBCONSULTANT thereby remises, releases, discharges and holds harmless AMEC, its parent, subsidiaries and affiliates, including their respective officers, agents and employees, from any and all claims, demands, liens and lien rights against AMEC and its Client, their respective properties, on account of goods or services arising out of the performance of work and/or services on, and the provision of materials and equipment for, the above-referenced Project by the SUBCONTRACTOR/SUBCONSULTANT and any of its officers, agents, employees, subcontractors, sub-subcontractors, subconsultants, sub-subconsultants and materialmen under the Subcontract Documents.
- Upon payment of the final invoice, the SUBCONTRACTOR/SUBCONSULTANT thereby assigns, transfers, sets over and releases to AMEC all right, title and interest to all refunds, rebates, credits, or other amounts (including any interest thereon) arising out of the former’s performance under the Subcontract Documents with respect to the above-referenced Project, together with all rights of action accrued, or which may hereafter accrue, thereunder and with respect thereto.

Receipt of the final payment shall not relieve or release the SUBCONTRACTOR/SUBCONSULTANT from any surviving obligations or liabilities arising out of or resulting from the terms of the Subcontract Documents.

**IN WITNESS WHEREOF,** this Subcontract Work Order Closeout Form and Lien Release has been executed this day of , 20 . By my signature, I certify that I am authorized and empowered to sign for and on behalf of the SUBCONTRACTOR/SUBCONSULTANT by all necessary authority and within the scope of my authority on behalf of such entity.

**SUBCONTRACTOR/SUBCONSULTANT:**

{Insert Name}

By: __________________

(Signature)

Name: __________________

(Printed Name)

**WITNESSES:**

Signature/Title: __________________

Signature/Title: __________________

Signature/Title: __________________

Signature/Title: __________________

**Exhibit “C”**
AMEC Environment & Infrastructure
Subcontractor Health, Safety, and Environmental (HSE) Loss Prevention Policy

Construction Projects, US Edition

December 2011

The Subcontractor is responsible for participating in and enforcing the safety and loss prevention programs established for the Project that will cover all Work performed by it and its Sub-Subcontractors.

Subcontractor shall cooperate fully with AMEC, the Owner, and all insurance carriers and loss prevention engineers on loss and accident prevention.

In order to maintain a safe work place for individuals working at the AMEC project site, the following items establish the minimum Subcontractor responsibilities toward achieving the AMEC project safety goals. AMEC Subcontractors shall brief their employees on the following AMEC requirements and enforce them with their employees. AMEC management may stop or suspend work at any time the Contractor fails to comply with AMEC or regulatory safety, health and environmental requirements. Each AMEC Subcontractor is responsible for the compliance with this policy and must complete and return the attached Acknowledgment Form to AMEC after having read the information below.

1. Subcontractor acknowledges and understands all pertinent health, safety and environmental (HSE) regulations, AMEC HSE requirements, and the Client/Owner HSE requirements and specifications for the scope of work, and commits to compliance with the most stringent of these requirements. Subcontractor shall perform all parts of its contract while assuming total responsibility for complying with all applicable AMEC, Federal, State, and local HSE standards, regulations, rules or guidelines such as the US Occupational Safety and Health Act of 1970 (29 CFR 1926 and 1910), US Army Corps of Engineers Health and Safety Requirements Manual, EM 385-1-1, and any host country Safety & Health Acts and Regulations, as applicable including all amendments and modifications.

2. AMEC Subcontractor has the sole responsibility for compliance with all of the above and all applicable HSE requirements and agrees to indemnify and hold harmless AMEC against any legal liability or loss including personal injuries or fatalities which may occur due to the Subcontractor’s failure to comply with the HSE acts, standards, rules, and regulations. AMEC Subcontractor may be required to pay back any losses suffered as a result of Subcontractor’s HSE violations.

3. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention and who shall have the responsibility and full authority to enforce the program. This person shall ensure that all Subcontractor and Sub-Subcontractor employees understand and comply with the safety programs. Where applicable, Subcontractor shall form a Safety Committee or cause workers to select Safety Representative as prescribed.

4. Subcontractor must submit the HSE Questionnaire and disclose all requested information. Failure to do so may result in disqualification.

5. Subcontractor shall not direct, or permit an employee to work under conditions that are not in compliance with or that are prohibited by any applicable federal, state, and local HSE acts, standards, regulations, rules or guidelines.

6. Subcontractor shall maintain documentation at the project site and/or home office that verifies that its health, safety, and environmental program is on-going and is in current compliance with applicable federal, state, provincial, local, and project safety regulations, rules or guidelines, including retaining copies of prescribed engineering reports on-site.

7. Subcontractor shall initiate and maintain an accident (injury and illness) prevention program and environmental protection program for the duration of the project which shall include, but not be limited to, active participation by the Subcontractors project managers, superintendents, office staff
and foremen. Subcontractor shall be responsible for this program’s implementation and continued compliance with that program. Subcontractor shall include all of its personnel (including office staff) in the project safety, health and environment program.

8. The costs of compliance with all HSE requirements are included in Subcontractor's bid. AMEC shall not consider additional charges for compliance with OSHA regulations, federal, state, local and project safety regulations, USACE requirements or AMEC Site Safety and Health and Safety Plans.

9. Subcontractor shall submit to AMEC a site-specific health and safety plan (HASP), accident prevention plan (APP) or agreed HSE planning elements, which shall meet AMEC requirements and OSHA, federal, state, local safety regulations or client-specific requirements (such as compliance with the most current USACE Health and Safety Manual EM 385-1-1 whenever applicable).

The Subcontractor HASP, APP or other agreed HSE planning elements, at a minimum shall have policies and/or procedures addressing the following or as applicable per the contracted scope of work;

- **Accident Prevention Signs, Tags and Barricades** – including provisions in accordance with the latest version of the Manual of Uniform Traffic Control Devices (MUTCD), as applicable.
- **Asbestos, Lead, PCBs, UXO or other Unforeseen Hazardous Materials** – inspections findings and abatement plans shall be immediately reported/provided to AMEC.
- **Competent Person (CP)** – CP designation for specific activities, as required by OSHA safety regulations e.g. fall protection, traffic protection, excavation, scaffolding, confined space entry, and lockout/tagout, etc. Subcontractor shall provide AMEC with documentation to demonstrate the competency for the assigned activity or task.
- **Compressed Gas Cylinders** – including safety, handling and storage.
- **Concrete and Masonry** – including required bracing or shoring as required.
- **Confined Space Entry** – program shall be developed in accordance with OSHA 29 CFR 1910.146 and EM385-1-1 safety regulations. A preparatory meeting shall be conducted with entry team members and AMEC prior to any confined space entry.
- **Control of Hazardous Energy (Lockout/Tagout)** – to include all potential sources of hazardous energy including but not limited to electrical, mechanical, pressure (pneumatic, hydraulic, or steam), hazardous substances in closed systems, etc.
- **Cranes** – The most stringent regulatory requirements shall apply. Copies of the annual inspection report, a pre-use inspection, daily operator inspections, permits, testing and maintenance records shall be submitted to AMEC for review. Cranes shall have anti-two block devices, and either: load moment shut offs or alarms; or load and boom angle indicators. Operators, riggers and signal persons shall be trained and certified in accordance with OSHA 1926, Subpart CC and records kept on file. Lift Plans shall be submitted to AMEC for review whenever lifts exceed 75% capacity in the specific crane/lift configuration, blind lifts, lifts involving more than one crane, lifts involving shifting loads such as liquids, lifts of hazardous materials, lifts involving unusual rigging or any lift determined by the operator to need a lift plan. Roll over protection shall be used when conditions or regulations call for such use. Other submittals, including rope certifications may be required by AMEC.
- **Crystalline Silica Grinding** – abrasive blasting and foundry operations containing crystalline silica, shall comply with OSHA regulations 29 CFR 1910.94 and USACE EM 385-1-1, Section 6 (when applicable).
- **Cutting, Burning, Welding and other “Hot Work”** – permits shall be obtained from AMEC before any welding, burning, cutting, or other “hot work” is done. Shields shall be provided to protect others exposed to weld arc radiation. PPE appropriate to the job shall be used. Adequate fire extinguishers shall be provided. A fire watch shall be provided and maintained for one hour after Hot Work has concluded. Safe work practices shall be utilized which may include the use of combustible gas meters to check for explosion hazards before beginning Hot Work. The subcontractor is responsible for all testing and monitoring required by applicable regulations, assuring work place safety and providing test results to AMEC.
- **Demolition** – an engineering survey shall be required and submitted to AMEC prior to demolition of structures detailing structural hazards, presence of utilities, presence of hazardous or toxic materials and appropriate demolition methods including dust and pollution control measures.

- **Disciplinary Policy** – to include measures to address inappropriate workplace behaviors, serious and/or repeat safety violation, etc. up to and including immediate removal of a contract employee/supervisor from a site.

- **Drug and Alcohol** – AMEC Subcontractor shall enforce all drug-free workplace requirements, which may include pre-employment, random, post-injury and for cause testing as required by contract requirements.

- **Electrical Safety** – an electrical safety program shall be established which meets the requirements of OSHA 1926, Subpart K, EM385-1-1, Section 11 (whenever applicable) and NFPA 70E. The most stringent requirements shall apply. Conduct of electrical work shall always be done on de-energized systems. Where work near energized conductors is necessary, a risk assessment and arc hazard analysis shall be performed in accordance with NFPA 70E–2012. Electrical connections, disconnections, installations and repairs shall only be made by qualified electrical workers. Power tools and equipment shall be properly grounded or double insulated. Extension cords shall meet the requirements of NFPA 70 and be Extra Hard Usage duty. Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered. Cords shall be inspected daily by users and protected from damage. All field/construction work shall require the use of ground fault circuit interrupters (GFCI) and watertight connectors. GFCIs shall be tested at least monthly. All damaged extension cords shall be immediately removed from service. Except where bulbs are recessed in the reflector, bulbs on temporary lights shall be guarded. Temporary lights shall not be suspended by their electric cords unless designed for this use. Explosion-proof bulb covers shall be used when contact with flammable vapors or gases are possible and installation shall meet Class 1, Division 1 requirements.

- **Elevating Work Platforms** – boom and scissor lift operators shall be trained. Personal fall arrest systems shall be used by personnel with lanyards attached to designated attachment points. Lifts without designated attachment points will not be used at AMEC project sites. Design and testing submittals of crane-suspended work platforms shall be provided to AMEC prior to use.

- **Emergencies** – plans to ensure employee safety in case of fire or other emergency shall be prepared in writing and reviewed with all affected employees. Plans shall include emergency notification system, escape procedures and routes, critical plant operations, employee accounting, rescue and medical duties, means of reporting emergencies and persons to be contacted for information or clarification. In an emergency affecting the safety of life, work or adjoining property, the subcontractor, without special instructions or authorization from AMEC, Client, or Owner, shall take actions necessary to prevent potential loss or injury. Emergency plans shall be tested to ensure their effectiveness.

- **Employee Training** – a Health & Safety training program shall be initiated and maintained. The subcontractor shall be responsible for this program’s implementation and continued compliance. All subcontractor employees, including project managers, supervisors, superintendents, office staff and foremen shall be trained in the recognition, evaluation, and control of hazards associated with their work including hazards of tools, machinery, physical, chemical and biological hazards. Employees shall also be trained in the provisions of the Activity Hazard Analyses for the work. All training, meetings and indoctrinations shall be documented in writing by date, name, content and trainer. The following and other applicable items shall be continuously emphasized:
  - Continuous and effective 100% fall protection,
  - Ladder and scaffold use,
  - Confined space operations,
  - Lock-out/Tag-out,
  - HAZCOM,
  - HAZWOPER,
  - Electrical safety,
  - Respiratory protection,
  - Traffic control,
- PPE,
- Change management,
- Trenching & excavation,
- Ground disturbance, proximity to overhead utility lines,
- Cranes, rigging, hoisting,
- Safe driving,
- Site-specific hazards, activity hazard analysis and techniques,
- Emergency Response and First Aid,
- All activities requiring permits as listed in this document.

- **Equipment** – shall be operated by designated, qualified operators. Proof of qualifications shall be kept on the project site for review. A copy of the equipment owner's manual shall be on-site and reviewed for additional safety precautions or requirements. Additional safety precautions or requirements recommended by the manufacturer shall be incorporated into the AHA. Equipment shall be inspected in accordance with manufacturer's recommendations for safe operation by a competent person prior to being placed into use. Daily inspections shall be conducted and documented by designated competent persons. Equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

- **Equipment Operators** – construction equipment operators shall be qualified by training or experience, per the requirements of federal, state, local laws and regulations and authorized by the subcontractor. Copies of certifications of competency for initial and refresher training shall be provided to AMEC from the employer or third party meeting OSHA standards for all crane, forklift and aerial lift operators. Training must include both a written and operator proficiency component, applicable to the specific manufacturer and model of equipment to be used.

- **Excavations** – a designated Competent Person shall inspect excavations on a daily basis and after each precipitation or other condition changing event. The CP shall be responsible for determining soil classifications, atmospheric hazards, proper protective measures, ground water considerations and ensure employees safety in accordance with 29CFR1926, Subpart P and EM385-1-1, Section 25 (when applicable). All subcontractors’ personnel entering excavations shall be trained in trench safety. Personnel will work within the confines of any installed protective device at all times. The CP shall be on-site when excavation work is performed and shall inspect, document the excavations daily prior to entry by workers. All required permits shall be obtained before any excavation begins. When Subcontractor is responsible for design of excavation, shoring, trenches or barrier walls, using tabulated data or full design/approval (i.e., P.E.) documentation shall be presented to AMEC in advance and a copy maintained onsite.
  - Underground utility locations must be positively identified using by a private utility locating service in addition to any station locating service and coordinated with the station utility department. Any utility locate markings must be maintained throughout the contract.
  - When construction activity is expected within three (3) of any adjacent underground system, hand digging using wooden or fiberglass tools must be used to physically verify utility locations.
  - If construction is parallel to an existing utility, within five (5) feet of the excavation, the utility shall be exposed by hand digging every 30.5 m (100 feet) while parallel to the excavation.
  - The location of utilities within concrete slabs must be coordinated with utility owners in addition to a private locating service. Outages on system utilities shall be used in circumstances where concrete chipping, saw cutting, or core drilling is required and utilities are unable to be completely identified.
  - Trenching machinery with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file at the project site.

- **Exposure to Airborne Contaminants** – engineering controls shall be preferentially used, followed
by administrative controls and PPE, in that order, to maintain employee exposures to airborne contaminants to levels below OSHA Permissible Exposure Limits AND current ACGIH Threshold Limit Values. When other applicable regulations apply, the most stringent will prevail. Adequate safety measures protecting against occupational disease exposures such as gases, fumes, dusts and chemicals that may be injurious to the project work-force shall also be provided.

- **Fall Protection** – Subcontractor shall ensure its employees implement 100% fall protection when working at elevations in excess of 6 feet if not protected by a full guardrail system. A fall protection and prevention plan shall be established for the protection of all employees exposed to fall hazards. The plan shall include company policy, identify responsibilities, training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment, rescue and escape procedures. Fall protection must comply with OSHA 1926, Subpart M and EM385-1-1, Section 21 (when applicable). Personal fall arrest equipment, systems, subsystems and components shall meet ANSI Z359.1.

- **Fire Prevention and Protection** – work areas shall be maintained free of fire hazards. Suitable fire extinguishers shall be provided and employees shall be trained in their use. Hot Work Permits shall be obtained for all flame and spark producing activities, including welding, cutting, grinding operations and temporary heating devices

- **First Aid** – a trained subcontractor first aid provider and first aid supplies shall be available on each shift and at each location.

- **Hazard Communication** – a Hazard Communication Program (designating a responsible person) and Material Safety Data Sheets for hazardous substances shall be submitted to AMEC prior to bringing the materials onto the site. Copies shall be maintained at the site and shall be available to employees using the materials. All employees shall be trained in HAZCOM and have current training records available for inspection by AMEC.

- **Hazardous Waste Operations** – where contracted scope requires work in a Hazardous Waste Operations exclusion or contamination reduction zone, certificates of required training and medical qualifications shall be submitted to AMEC for each employee prior to commencement. Additional requirements may apply.

- **Hearing Protection** – hearing protection shall be provided and use required in accordance with OSHA and/or EM385-1-1 regulations as contractually required.

- **Housekeeping** – Work areas shall be maintained in an orderly fashion, free of debris, tripping and/or fire hazards. All debris in work areas shall be cleaned up daily or more frequently if necessary. Waste materials shall be containerized and disposed of properly. Hazardous work areas shall be barricaded and posted to safeguard employees and prevent unauthorized entry. Overhead tools and equipment shall be secured so that they will not fall. Guard rail openings shall be small enough to prevent passage of potential falling objects. Subcontractor shall provide sanitary facilities such as toilet and hand washing facilities in compliance to OSHA 1926 and EM385-1-1 (when applicable) requirements.

- **Incident Reporting and Investigation** – all incidents, near misses and/or injuries regardless of severity shall be reported as soon as possible but no later than two (2) hours. Examples include but are not limited to; OSHA recordable injuries and illnesses, property damage greater than $500 in value, motor vehicle accidents, contact with energized electrical conductors, fire or explosion, environmental spills and releases, exposures to airborne contaminants or radiological sources in excess of occupational exposure limits regardless of the use of respirators, employee complaints of signs and symptoms consistent with exposure to site chemicals, structural failure of any prescribed engineered design. The subcontractor is responsible for obtaining appropriate medical and emergency assistance and for notifying AMEC, fire, law enforcement, and regulatory agencies. The subcontractor shall assist and cooperate fully with AMEC in conducting investigation(s) of the accident. Except for rescue and emergency measures, the accident scene shall not be disturbed until it has been released by the investigating official. Daily records of all first-aid treatments not otherwise reportable shall be maintained and furnished to AMEC upon request.
• **Inspections** – daily inspections by Subcontractor Competent Person(s) shall be conducted. Subcontractor Management shall conduct a weekly inspection of all of its work areas and activities. Documentation of findings and corrective action status shall be submitted to AMEC. Follow-up inspections shall ensure the correction of any identified deficiencies. AMEC shall be given an opportunity to accompany the Subcontractor on its inspections. Subcontractor agrees to participate in AMEC inspections, as requested.

• **Ladders** – only Heavy Duty ladders of composite (nonmetal) construction shall be used and employees trained to use them properly. Ladders shall be inspected before each use. Use of ladders with defective components or faulty construction is prohibited. Ladders must not be placed adjacent to a door unless the door is locked or guarded. Proper angles and extensions above the landing shall be maintained and all ladders shall be properly secured.

• **Mobile Construction Equipment** – mobile construction equipment shall be new or in like-new condition and include reverse signal alarms, fire extinguishers, safety glass where enclosed cabs are provided, seat belts and roll over protection structures (ROPS), falling/flying Object Protection Structures and metal cab shields where required. A qualified person shall perform an initial inspection when equipment is first brought onto the site. AMEC and AMEC's client shall be given the opportunity to observe the initial inspection. Equipment operators shall be adequately trained and daily equipment inspections shall be conducted and recorded. Equipment with deficiencies affecting safe operations shall be removed from service until repaired. Equipment shall be operated in a safe manner at all times.

• **Non-English Speaking Workers** – non-English speaking workers shall have a person(s), fluent in the language(s) spoken as well as English to be on site when work is being performed, to interpret and translate as needed.

• **Overhead Utilities** – utility lines shall not be approached within than 20 feet (6 m) unless the line voltage and regulatory clearance distances are known or the power utility company provides clearance/de-energizing.

• **Permit and Authorization System** – work permits or documented authorization/approval shall be obtained from or through AMEC before:
  o Work on existing pipelines or equipment.
  o Entering any spaces that can be considered confined spaces.
  o Entering any designated high-hazard areas.
  o Electrical work and utilizing of de-energizing/lockout/tagout systems.
  o Using any open flame or spark producing tool or potential ignition source.
  o Closing walkways, roads, or restricting traffic.
  o Starting excavations, drilling, boring, preparing test pits or using geophysical equipment or any other exploratory equipment requiring penetration of surfaces.
  o Removing tanks from excavations.
  o Backfilling excavations.
  o Sandblasting or spray painting.
  o Any situations requiring use of personal fall arrest systems.
  o Operating equipment closer than regulated distances from overhead power lines, pipelines or underground utilities.
  o Opening or cutting through firewalls or beams.
  o Starting renovation or demolition activities.
  o Tying into or disconnecting utilities.
  o Fueling or repairing operating equipment at AMEC project sites.
  o Any activity requiring Competent or Qualified Persons.

• **Personal Protection Equipment** – Subcontractor shall provide all necessary personal protection equipment for their employees. PPE shall meet applicable OSHA, NIOSH, ANSI standards. Each employee shall be trained and required to inspect, wear, proper use and maintenance of his/her personal protective equipment. Additional PPE may be specified in the Contract Documents, Site Safety and Health Plan, and Activity Hazard Analyses to meet specialized construction activities, changing regulations or job needs. Minimum PPE requirements for AMEC construction project site includes hard hat, safety-toe footwear, safety glasses, Type II or III safety vest, shirt with sleeves and long pants.
Physical Qualifications of Employees – All subcontractors’ personnel shall be physically, medically, and emotionally (ready, willing and able) qualified for performing the duties to which they are assigned. Medical documentation shall be recorded using applicable medical screening and/or medical history and examination forms and shall be maintained in accordance with the applicable privacy regulations such as US 5 CFR 293, Privacy Act.

Regulatory Inspections and Visits – In the event of any OSHA, EPA or other regulatory agency inspection, The Contractor shall immediately notify AMEC and provide an opportunity to accompany the Subcontractor on the inspection. The inspection will not be delayed due to non-availability AMEC. The Contractor shall provide AMEC with a copy of any citations or reports issued by the inspector and any corrective action responses to the citation(s) or report(s).

Rigging – slings and hardware used in lifting shall be tagged with safe working load capacities in accordance with 29CFR1926, Subpart H, CC and EM385, Section 15 (when applicable). Lifting hardware shall be inspected on a daily basis by a Competent Person. Defective equipment shall be removed from service and tagged or destroyed.

Safety Meetings – weekly safety meetings shall be conducted and documented with a list of employees, topics discussed, name/position of the individual conducting the meetings, and the signatures of attendees. AMEC may require daily safety meetings, dependant on the level of project hazards. Safety meeting documentation shall be made available to AMEC upon request. Additional safety meetings shall be conducted as required to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish/review safe working procedures for anticipated hazards and to provide pertinent safety and health training and motivation.

Safety Poster Board – AMEC’s general contractor shall erect and maintain a safety and health bulletin board as per applicable safety regulations or USACE EM 385-1-1 (September 2008), section 01.A.06.

Site Safety Orientation – initial safety orientations shall be provided to new employees upon arrival to the job-site. Orientations shall include applicable safety hazards, personal protective equipment requirements, rules and limitations of equipment operations, what to do in case of injury or illness and location of medical station(s), employee’s required attendance at weekly safety meetings and obligation to report observed or known unsafe conditions or practices to the employees’ immediate supervisors. Training shall be documented, including topics discussed, trainers name, date and employees names and signatures.

Scaffolds – Notwithstanding OSHA’s scaffolds standard requirements, **100% fall protection above 6 feet shall be implemented.** Fall protection requirements when working above six feet or above dangerous operations shall be provided in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work. Scaffolds shall be erected and inspected under the supervision of a Competent Person, who shall tag scaffolds as safe for use. Proper access shall be provided. All scaffolds shall conform to ANSI standard A10.8, 29 CFR 1910.28 and EM385-1-1, Section 22 (when applicable) regulations as contractually required.

Site Visitors – All visitors to Subcontractor controlled sites shall be briefed by a Qualified Person on site hazards to be expected and the safety and health controls required.

Smoking and Open Flames – smoking and the use of open flames are strictly prohibited in areas where flammable liquids, gases, or highly combustible materials are stored, handled, or processed. “No Smoking” signs shall be posted and obeyed.

Solvents and Paints – adequate ventilation must be maintained at all times when paints or solvents are used. Personnel shall use proper respiratory protection and protective clothing when toxicity of the material requires such protection. Solvents and flammable materials shall not be used when possible sources of ignition exist. Storage must be in accordance with OSHA 1926.152 and EM385-1-1, Section 9. Flammable liquids must be dispensed in safety cans with flash arresters bearing a FM, UL or DOT approval. Containers must be clearly identified as to their contents. Copies of the MSDS shall be provided to AMEC and maintained onsite. Appropriate spill kits and trained personnel required to handle or respond to spills of flammable liquids, solvents or paints shall be provided.
• **Steel Erection** – Notwithstanding OSHA’s Steel Erection standard, Subcontractor agrees to implement 100% fall protection above 6 feet. All requirements of OSHA 1926, Subpart R and EM385-1-1, Section 27 shall be adhered to. Where differences exist, the most stringent shall apply.

• **Storage** – Subcontractor construction materials shall be handled and stored in a safe manner to prevent falling, rolling, collapse, tripping hazards or fire hazards.

• **Stilts** – are prohibited on AMEC projects

• **Subcontractor Health and Safety Personnel** – Subcontractor agrees to furnish full time or collateral duty health and safety (HS) personnel. HS personnel shall have the experience and skills specified in the Contract Documents. Proof of competency/qualification shall be submitted to AMEC for acceptance prior to the start of that work activity. Minimum requirements shall include current training as necessary, i.e., for HAZWOPER sites - 40 Hour initial HAZWOPER training, current refresher, and supervisor’s training; OSHA 10- or 30-hr construction training (depending on Client requirements or regulatory requirements); current HAZCOM and First Aid/CPR training are mandatory. Subcontractor shall provide AMEC with the resume(s) for the HS personnel to demonstrate that the individual(s) have appropriate experience. Competent Person(s) shall be trained in relevant safety aspects. The names of the Competent/Qualified Person(s) required for a particular activity shall be identified and included in the Activity Hazard Analysis.

• **Tools, Machinery, Equipment** – Subcontractor shall provide and/or ensure tools, equipment, etc. are in safe working condition, are being used properly and good maintenance/repair practices are performed. Manufacturer’s guards, safety devices and/or recommended safeguards shall be sound and operable. Damaged or unsafe equipment shall be removed from service. Unsafe operations shall be corrected immediately.

• **Underground Utilities** – intrusive activity such as excavation or drilling must implement procedures to protect workers, public and the environment from inadvertent contact with all underground utilities. Procedures will comply with all state and local requirements including the use of appropriate utility locating and marking service (e.g. DIGSAFE).

• **Unsafe Acts and Conditions** – Subcontractors principles such as a project manager, superintendent or foreman shall take immediate steps to remedy or remove the unsafe condition or act in question.

• **Vehicle Safety** – Vehicles shall only be operated by personnel with valid licenses and good driving records. All vehicles at AMEC job sites and facilities must observe a maximum speed limit of 10 mph, unless otherwise posted. Seat belts shall be used for all drivers and passengers. At job sites where narrow roads and/or short-sight distances exist, no passing of moving vehicles is permitted. Vehicles shall have all required inspection/operating permits and must be parked in designated areas. When operating under the authority of EM 385-1-1, the following provision shall apply: Operators of motor vehicles, while on duty, shall not operate vehicles for a continuous period of more than ten (10) hours in any 24-hour period; moreover, no employee, while on duty, may operate a motor vehicle after being in a duty status for more than twelve (12) hours during any 24-hour period. A minimum of eight (8) consecutive hours shall be provided for rest in each 24-hour period.

10. Subcontractor shall submit to AMEC an Activity Hazard Analysis (AHA) for each major phase of its work at least one week prior to commencement of site operations. AMEC utilizes the USACE EM 385-1-1 format for the AHA. Work shall not begin until the AHA for the work activity has been accepted by AMEC and the AMEC Client (when applicable) and discussed with all engaged in the activity, including AMEC, Subcontractor(s) at preparatory meetings.

11. Subcontractor agrees to attend the following meetings and to participate in discussions concerning its HSE operations:

- Pre-construction meeting (Management representative)
- At least weekly tailgate safety meetings (all workers and supervisors)
- Incident investigation reviews (Management representative)
- Monthly safety committee meetings (Management representative)
Subcontractor agrees and acknowledges that the failure to perform or comply with any of the requirements set out in this attachment shall constitute a default of Subcontractors obligations under AMEC contract.

By signing this form I certify that I have read, understood, and agree to comply with AMEC Environment & Infrastructure Subcontractor’s Health, Safety & Environmental Loss Prevention Policy (December 2011 Edition)

Subcontractor agrees and acknowledges that the failure to perform or comply with any of the requirements set out in AMEC HSE Loss Prevention Policy shall constitute a default of Subcontractors obligations under AMEC contract.

SIGNATURES REQUIRED

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Subcontractor Health, Safety, and Environmental Evaluation Form

Company Name: _____

☐ MASTER for all projects
☐ Proposal/Specific Project: _____

This form is not needed if supplies and no services are to be provided. Subcontractors within the following service industries are also excluded: Advertising, Computer & Data Processing, Accounting, Research, Laboratory Services (that do not include field work), Management and Miscellaneous Business Services. This form is required for specific field services on a project or MSSA.

### 1. WORK ACTIVITIES

Check the type of general services you will provide AMEC (* = 2007 NAICS code):

- ☐ Laboratory Services including Field Work (541)
- ☐ Surveying Services (541)*
- ☐ Construction Services (541)*
- ☐ Consulting Services (541)*
- ☐ Waste Transportation Services (562)*
- ☐ Drilling (238)*
- ☐ Remediation Services (562)*
- ☐ Other (State Type): _____

Number of employees in company: _____

Please briefly describe the scope of work you will be performing and if you will be working alone or if an AMEC employee will be present. _____

### 2. EMR

List your firm's Experience Modification Rate (EMR) for the past five years.

| Year | EMR
<table>
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<tr>
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<tbody>
<tr>
<td>20__</td>
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<tr>
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</tbody>
</table>

NOTE: All employers must have some form of Workers' Compensation Insurance which is tied to the EMR. Attach EMR letter from underwriter. If you do not have an EMR, please provide an explanation. _____

### 3. SAFETY PERFORMANCE

Use your OSHA’s Form 300 to fill in safety statistics for the last five full years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Hours Worked</th>
<th>Recordable cases</th>
<th>Lost Workday cases</th>
<th>Restricted/Transferred cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>20__</td>
<td>20__</td>
<td>20__</td>
<td>20__</td>
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<td>20__</td>
</tr>
</tbody>
</table>
**Subcontractor Health, Safety, and Environmental Evaluation Form**

### e. Number of fatalities

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

If you do not maintain an OSHA 300 Log, use OSHA’s definitions as defined in 29 CFR 1904 associated with lost time, restricted duty and medical treatment beyond first aid to complete the above table.

### 4. SAFETY MATURITY

#### 4A. Do you have a written safety program/ manual?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No □</td>
<td>Yes □</td>
</tr>
<tr>
<td>If yes, submit a copy of your Table of Contents</td>
<td></td>
</tr>
</tbody>
</table>

#### 4B. Do you hold project-specific safety meetings, such as pre-job briefs, plan-of-the-day, toolbox, or tailgate?

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily □</td>
<td>Weekly □</td>
<td>Bi-weekly □</td>
<td>Monthly □</td>
</tr>
<tr>
<td>Less often, as needed □</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4C. Do you conduct project safety inspections and audits to ensure compliance with your company’s safety requirements?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No □</td>
<td>Yes □</td>
</tr>
</tbody>
</table>

If yes, who conducts the inspections and audits?

<table>
<thead>
<tr>
<th>NAME:</th>
<th>HOW OFTEN?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE:</th>
<th>HOW OFTEN?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4D. Do employees who will work with or on this AMEC project read, write, and understand English such that they can perform work safely by following instructions without the use of an interpreter?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No □</td>
<td>Yes □</td>
</tr>
</tbody>
</table>

#### 4E. Will you have a designated safety professional involved with work conducted for AMEC?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No □</td>
<td>Yes □</td>
</tr>
</tbody>
</table>

### 5. SAFETY TRAINING PROGRAMS

What training do you provide for your employees? Complete all training topics as either Yes, No or NA.

<table>
<thead>
<tr>
<th>Training Topic</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Training Topic</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Head Protection</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>m. Fire Protection</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. Eye Protection</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>n. First Aid/CPR</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>c. Hearing Protection</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>o. Emergency Procedures</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>d. Respiratory Protection</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>p. Toxic Substances</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>d. Fall Protection</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>q. Trenching and Excavation</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>e. Scaffolding</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>r. Signs, Barricades, Flagging</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>f. Drilling Operations</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>s. Electrical Safety</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>g. Housekeeping</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>t. Rigging and Crane Safety</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>h. Hot Work</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>u. Vehicle Safety (Driving)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>j. Sandblasting Safety</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>w. Confined Space Entry</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>k. Asbestos Work Safety</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>x. Incident Reporting</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>l. HAZWOPER Training</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### 6. OSHA COMPLIANCE

6A. Has your company received any OSHA citations from a state, or federal agency within the last five (5) years?  
- No [ ]  
- Yes [ ]  
  If yes, please provide copies of citations.

6B. Has your firm been cited within the last five (5) years for any environmental-related violations or other forms of Notices of Violation (NOVs)?  
- No [ ]  
- Yes [ ]  
  If yes, please describe _____

### 7. REFERENCES

7A. List three (3) client references that could verify the quality and management commitment of your safety program.

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name:</td>
<td>______</td>
</tr>
<tr>
<td></td>
<td>Contact:</td>
<td>______</td>
</tr>
<tr>
<td>2</td>
<td>Name:</td>
<td>______</td>
</tr>
<tr>
<td></td>
<td>Contact:</td>
<td>______</td>
</tr>
<tr>
<td>3</td>
<td>Name:</td>
<td>______</td>
</tr>
<tr>
<td></td>
<td>Contact:</td>
<td>______</td>
</tr>
</tbody>
</table>

COMPLETED BY:

- Print Name: _____
- Date: _____  
- Phone #: _____

- Signature________________________
- Title:________________________
# Supplier Information Form

Please Complete All Sections

## Supplier Name:

<table>
<thead>
<tr>
<th>Address:</th>
<th>City:</th>
<th>State:</th>
<th>Zip:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remit-To Address:</td>
<td>City:</td>
<td>State:</td>
<td>Zip:</td>
</tr>
<tr>
<td>Phone: ( )</td>
<td>Fax: ( )</td>
<td>Website:</td>
<td></td>
</tr>
<tr>
<td>Contact:</td>
<td>Email:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Corporation | Partnership or LLC | Sole Proprietor | Individual | Foreign |
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>State of Incorporation:</td>
<td>Federal Tax ID Number:</td>
<td>Social Security Number:</td>
<td></td>
<td>Country:</td>
</tr>
</tbody>
</table>

- Is your company registered with **Central Contractor Registration (CCR)**? *(Required by AMEC in support of any Federal contract)*  
  - [ ] Yes  → Company DUNS: [ ]  
  - [ ] No  
  
- **Business Classification** *(check all that apply)*
  - [ ] Small Business  
  - [ ] Women Owned  
  - [ ] Large Business  
  - [ ] Disadvantaged  
  - [ ] Service Disabled Veteran Owned  
  - [ ] Government Entity  
  - [ ] HUBZone  
  - [ ] Veteran Owned  
  - [ ] Non-Profit  
  - [ ] Alaskan Native Corporation  
  - [ ] Historically Black Colleges & Universities / Minority Institutions  

*Information on misrepresentation of your business size is governed by FAR 19.301 and can be found here: [https://www.acquisition.gov/FAR/current/html/Subpart%2019_3.html](https://www.acquisition.gov/FAR/current/html/Subpart%2019_3.html)*

- **Number of Employees:** [ ]

- Is your company currently listed on the Excluded Parties Listing System *(www.epls.gov)*?  
  - [ ] Yes  
  - [ ] No  

Please list **ALL services company provides**:

- ALL STATES
- Alabama
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- Florida
- Georgia
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Hampshire
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- Wisconsin
- Wyoming

- I hereby guarantee that the above information is true and accurate to the best of my knowledge.

  **Printed Name of Owner/Officer** __________________________  **Signature of Owner/Officer** __________________________  **Date** __________________________

*Please return the completed form to the requesting AMEC representative.*

**For AMEC Use Only:**

- [ ] New Setup  
- [ ] Annual Completion  
  
  **Supplier Number:** __________________________

Rev. 7/5/2011
### Part I  Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see How to get a TIN on page 3.

**Note.** If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

### Part II  Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and

2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and

3. I am a U.S. citizen or other U.S. person (defined below).

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

### General Instructions

**Section references are to the Internal Revenue Code unless otherwise noted.**

### Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners’ share of effectively connected income.

**Note.** If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester’s form if it is substantially similar to this Form W-9.

### Definition of a U.S. person

For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

**Special rules for partnerships.** Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners’ share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax.

Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,
The U.S. grantor or other owner of a grantor trust and not the trust, and
The U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a “saving clause.” Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty country.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called “backup withholding.” Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your income tax return. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your income tax return on the “Name” line. You may enter your business, trade, or “doing business as (DBA)” name on the “Business name” line.

Limited liability company (LLC). Check the “Limited liability company (LLC)” box only and enter the appropriate code for the tax classification (“D” for disregarded entity, “C” for corporation, “P” for partnership) in the space provided.

For a single-member LLC (including a foreign LLC with a domestic owner) that is disregarded as an entity separate from its owner under Regulations section 301.7701-3, enter the owner’s name on the “Name” line. Enter the LLC’s name on the “Business name” line.

For an LLC classified as a partnership or a corporation, enter the LLC’s name on the “Name” line and any business, trade, or DBA name on the “Business name” line.

Other entities. Enter your business name as shown on required federal tax documents on the “Name” line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the “Business name” line.

Note. You are requested to check the appropriate box for your status (individual/sole proprietor, corporation, etc.).

Exempt Payee

If you are exempt from backup withholding, enter your name as described above and check the appropriate box for your status, then check the “Exempt payee” box in the line following the business name, sign and date the form.
Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.  

**Note.** If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.  

The following payees are exempt from backup withholding:  
1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2),  
2. The United States or any of its agencies or instrumentalities,  
3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,  
4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or  
5. An international organization or any of its agencies or instrumentalities.  

Other payees that may be exempt from backup withholding include:  
6. A corporation,  
7. A foreign central bank of issue,  
8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,  
9. A futures commission merchant registered with the Commodity Futures Trading Commission,  
10. A real estate investment trust,  
11. An entity registered at all times during the tax year under the Investment Company Act of 1940,  
12. A common trust fund operated by a bank under section 584(a),  
13. A financial institution,  
14. A middleman known in the investment community as a nominee or custodian, or  
15. A trust exempt from tax under section 664 or described in section 4947.  

The chart below shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 15.

**Part I. Taxpayer Identification Number (TIN)**

**Enter your TIN in the appropriate box.** If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see How to get a TIN below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see Limited liability company (LLC) on page 2), enter the owner’s SSN (or EIN, if the owner has one). Do not enter the disregarded entity’s EIN. If the LLC is classified as a corporation or partnership, enter the entity’s EIN.

**Note.** See the chart on page 4 for further clarification of name and TIN combinations.

**How to get a TIN.** If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting www.irs.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write “Applied For” in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

**Note.** Entering “Applied For” means that you have already applied for a TIN or that you intend to apply for one soon.

**Caution:** A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.

**Part II. Certification**

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, and 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). Exempt payees, see Exempt Payee on page 2.

**Signature requirements.** Complete the certification as indicated in 1 through 5 below.

1. **Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983.** You must give your correct TIN, but you do not have to sign the certification.

2. **Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983.** You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.
3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. “Other payments” include payments made in the course of the requester’s trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

<table>
<thead>
<tr>
<th>For this type of account:</th>
<th>Give name and SSN of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Individual</td>
<td>The individual</td>
</tr>
<tr>
<td>2. Two or more individuals (joint account)</td>
<td>The actual owner of the account or, if combined funds, the first individual on the account.</td>
</tr>
<tr>
<td>4. a. The usual revocable savings trust (grantor is also trustee)</td>
<td>The grantor-trustee.</td>
</tr>
<tr>
<td>4. b. So-called trust account that is not a legal or valid trust under state law</td>
<td>The actual owner.</td>
</tr>
<tr>
<td>5. Sole proprietorship or disregarded entity owned by an individual</td>
<td>The owner.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For this type of account:</th>
<th>Give name and EIN of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Disregarded entity not owned by an individual</td>
<td>The owner.</td>
</tr>
<tr>
<td>7. A valid trust, estate, or pension trust</td>
<td>Legal entity.</td>
</tr>
<tr>
<td>8. Corporate or LLC electing corporate status on Form 8832</td>
<td>The corporation.</td>
</tr>
<tr>
<td>9. Association, club, religious, charitable, educational, or other tax-exempt organization</td>
<td>The organization.</td>
</tr>
<tr>
<td>10. Partnership or multi-member LLC</td>
<td>The partnership.</td>
</tr>
<tr>
<td>11. A broker or registered nominee</td>
<td>The broker or nominee.</td>
</tr>
<tr>
<td>12. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments</td>
<td>The public entity.</td>
</tr>
</tbody>
</table>

1 List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person’s number must be furnished.
2 Circle the minor’s name and furnish the minor’s SSN.
3 You must show your individual name and you may also enter your business or “DBA” name on the second name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.
4 List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see Special rules for partnerships on page 1.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, social security number (SSN), or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:
- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

Call the IRS at 1-800-829-1040 if you think your identity has been used inappropriately for tax purposes.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS personal property to the Treasury Inspector General for Tax Administration at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.consumer.gov/idtheft or 1-877-IDTHEFT(438-4338).

Visit the IRS website at www.irs.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, the District of Columbia, and U.S. possessions to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.
NOTICE TO PROCEED

Date: __________

TO: ____________________________
   (CONTRACTOR)

ADDRESS: ____________________________

PROJECT: ____________________________

You are notified that the Contract Times under the above contract will commence to run on ______, 20___. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement, the date of Substantial Completion is ________, 20___.

Before you may start any Work at the Site, the Agreement provides that you must deliver to the Engineer certificates of insurance which you are required to purchase and maintain in accordance with the Agreement.

Also before you may start any Work at the Site, you must submit the following to the Engineer for review no later than 14 days following the date of issuance of the Notice to Proceed, as required in the Specifications:

1. _______

2. _______

[Add other requirements as applicable]

______________________________
(ENGINEER)

By: ____________________________
   (AUTHORIZED SIGNATURE)

______________________________
   (TITLE)

(Signatures continued on Page 00 55 00 - 2)
NOTICE TO PROCEED (Cont.)

ACCEPTANCE OF NOTICE TO PROCEED

__________________________________________
CONTRACTOR

By:

__________________________________________
AUTHORIZED SIGNATURE

__________________________________________
TITLE

__________________________________________
DATE
PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:
Signature: __________________________ (Seal)
Name and Title:

SURETY

Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company:
Signature: __________________________ (Seal)
Name and Title:

SURETY

Signature and Title
(Attach Power of Attorney)

Attest:
Signature and Title:

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.
1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

   3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

   3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

   3.3. Owner has agreed to pay the Balance of the Contract Price to:

      1. Surety in accordance with the terms of the Contract;
      2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

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

   4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

   6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;
   6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and
   6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the 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 Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. 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 Contractor Default or within two years after Contractor ceased working or within two years after 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 period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated hereinafter. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

   12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
   12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
   12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
   12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker
Owner's Representative (engineer or other party)
PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:
Signature: __________________________ (Seal)
Name and Title: __________________________

(Space is provided below for signatures of additional parties, if required.)

SURETY
By:
Signature and Title
(Attach Power of Attorney)
Attest:
Signature and Title

SURETY
By:
Signature and Title
(Attach Power of Attorney)
Attest:
Signature and Title:

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.
1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:
   2.1. Promptly makes payment, directly or indirectly, for all sums due to Claimants, and
   2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, suits, or tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:
   4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
   4.2. Claimants who do not have a direct contract with Contractor:
      1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
      2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
      3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
   6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
   6.2. Pay or arrange for payment of any undisputed amounts.
   7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

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

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2, 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.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Surety'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.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.
Contractor's Application For Payment No.

To (Owner):  
From (Contractor):  
Project:  
Contract:  
Owner's Contract No.:  
Contractor's Project No.:  
Engineer's Project No.:  

APPLICATION FOR PAYMENT

Change Order Summary

<table>
<thead>
<tr>
<th>Approved Change Orders</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Additions</td>
<td>Deductions</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
<td>------------</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. ORIGINAL CONTRACT PRICE
2. Net change by Change Orders
3. CURRENT CONTRACT PRICE (Line 1 ± 2)
4. TOTAL COMPLETED AND STORED TO DATE
   (Column F on Progress Estimate)
5. RETAINAGE:
   a. ____% x $____ Work Completed
   b. ____% x $____ Stored Material
   c. Total Retainage (Line 5a + Line 5b)
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)
7. LESS PREVIOUS PAYMENTS (Line 8 from prior Application)
8. AMOUNT DUE THIS APPLICATION
9. BALANCE TO FINISH, PLUS RETAINAGE
   (Column G on Progress Estimate + Line 5 above)

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (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 Work covered by prior Applications for Payment; (2) title of 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 interest or encumbrances); and (3) all 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 other amount)
   is recommended by: ____________________________ (Engineer)  
   (Date)

Payment of: $__________
   (Line 8 or other - attach explanation of other amount)
   is approved by: ____________________________ (Owner)  
   (Date)

Approved by: ____________________________ Funding Agency (if applicable)  
   (Date)
## Progress Estimate

**Contractor’s Application**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification Section No.</td>
<td>Description</td>
<td>Scheduled Value</td>
<td>From Previous Application (C + D)</td>
<td>This Period</td>
<td>Materials Presently Stored (not in C or D)</td>
<td>Total Completed and Stored to Date (C + D + E)</td>
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<tr>
<td>Totals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**For (contract):**

**Application Number:**

**Application Period:**

**Application Date:**

---

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
# Progress Estimate

**Contractor's Application**

For (contract): 

Application Number: 

Application Period: 

Application Date: 

<table>
<thead>
<tr>
<th>Item</th>
<th>Bid Quantity</th>
<th>Unit Price</th>
<th>Bid Value</th>
<th>Estimated Quantity Installed</th>
<th>Value</th>
<th>Materials Presently Stored (not in C)</th>
<th>Total Completed and Stored to Date (D + E)</th>
<th>% (E/B)</th>
<th>Balance to Finish (B - F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid Item No.</td>
<td>Description</td>
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Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
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<th>A</th>
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<tbody>
<tr>
<td>Invoice No.</td>
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<td>Materials Description</td>
<td>Stored Previously</td>
<td>Stored this Month</td>
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Totals
Field Order
No. ____

Date of Issuance: ____________________________ Effective Date: ____________________________

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<tr>
<th>Project:</th>
<th>Owner:</th>
<th>Owner's Contract No.:</th>
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<th>Contractor:</th>
<th>Engineer's Project No.:</th>
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Attention:
You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.05A., for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: ____________________________ (Specification Section(s)) ____________________________ (Drawing(s) / Detail(s)) ____________________________

Description:

_________________________
_________________________
_________________________
_________________________
_________________________

Attachments:

_________________________
_________________________
_________________________
_________________________
_________________________

_________________________
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_________________________

Engineer: ____________________________

Receipt Acknowledged by (Contractor): ____________________________ Date: ____________________________

Copy to Owner
Work Change Directive
No. _____

Date of Issuance: ___________________________ Effective Date: ___________________________

Project: ___________________________ Owner: ___________________________ Owner's Contract No.: ___________________________

Contract: ___________________________ Date of Contract: ___________________________

Contractor: ___________________________ Engineer's Project No.: ___________________________

You are directed to proceed promptly with the following change(s):

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
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Attachments (list documents supporting change):

Purpose for Work Change Directive:

☐ Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

☐ Nonagreement on pricing of proposed change.

☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price $ ___________________________ (increase/decrease) Contract Time ___________________________ days (increase/decrease)

If the change involves an increase, the estimated amounts are not to be exceeded without further authorization.

Recommended for Approval by Engineer: ___________________________ Date: ___________________________

Authorized for Owner by: ___________________________ Date: ___________________________

Accepted for Contractor by: ___________________________ Date: ___________________________

Approved by Funding Agency (if applicable): ___________________________ Date: ___________________________
**Change Order**

No. __________

<table>
<thead>
<tr>
<th>Date of Issuance:</th>
<th>Effective Date:</th>
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<th>Contractor:</th>
<th>Engineer’s Project No.:</th>
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The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments: (List documents supporting change):

<table>
<thead>
<tr>
<th>CHANGE IN CONTRACT PRICE:</th>
<th>CHANGE IN CONTRACT TIMES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Contract Price:</td>
<td>Original Contract Times:</td>
</tr>
<tr>
<td>$________________________</td>
<td>☐ Working days ☐ Calendar days</td>
</tr>
<tr>
<td>[Increase] [Decrease] from previously approved Change Orders No.________ to No.________:</td>
<td></td>
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<tr>
<td>$________________________</td>
<td>Substantial completion (days or date):</td>
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<tr>
<td></td>
<td>Ready for final payment (days or date):</td>
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<tr>
<td>Contract Price prior to this Change Order:</td>
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<tr>
<td>$________________________</td>
<td>Contract Times prior to this Change Order:</td>
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<tr>
<td>[Increase] [Decrease] of this Change Order:</td>
<td></td>
</tr>
<tr>
<td>$________________________</td>
<td>Substantial completion (days or date):</td>
</tr>
<tr>
<td></td>
<td>Ready for final payment (days or date):</td>
</tr>
<tr>
<td>Contract Price incorporating this Change Order:</td>
<td></td>
</tr>
<tr>
<td>$________________________</td>
<td>Contract Times with all approved Change Orders:</td>
</tr>
</tbody>
</table>

RECOMMENDED:  

By:  

Engineer (Authorized Signature)  

Date:  

Approved by Funding Agency (if applicable):  

ACCEPTED:  

By:  

Owner (Authorized Signature)  

Date:  

ACCEPTED:  

By:  

Contractor (Authorized Signature)  

Date:  


Prepared by the Engineers’ Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.
Certificate of Substantial Completion

Project: 
Owner: 
Owner's Contract No.: 

Contract: 
Date of Contract: 

Contractor: 
Engineer's Project No.: 

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions:

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 Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. 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 Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

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 Documents.

Executed by Engineer

Accepted by Contractor

Accepted by Owner

Date

Date

Date
DIVISION 01 - GENERAL REQUIREMENTS
PART 1 - GENERAL

1.1 DESCRIPTION

A. SECTION INTENT: This section is intended to provide a summary of the project and the various elements of work associated with it. This summary should be used in conjunction with other Specification sections and the construction Drawings. This section does not provide the technical detail for particular Work Items, but describes the work as a whole, providing an overall perspective to the separate tasks and their interrelationships.

B. GENERAL: The work to be completed consists of two major components, and includes installation and maintenance of erosion and sedimentation control measures for each:
   2. Restoration of the Boardman River for approximately 13,300 linear feet through and upstream of the Brown Bridge Dam.

C. DAM REMOVAL SUMMARY:
   1. Dam removal consists of:
      a. Installation of temporary sedimentation basin upstream of the left embankment.
      b. Drilling of two borings (soil boring and concrete coring).
      c. Excavation of soil upstream of the powerhouse in the intake/forebay in the wet from elevation 783 feet to elevation 768 feet.
      d. Installation of temporary dewatering structure upstream of the powerhouse and dewatering of that structure.
      e. Demolition of temporary upstream powerhouse opening, removal of sand fill within the powerhouse, and removal of downstream temporary powerhouse opening.
      f. Drawdown of the pond elevation at the dam through the temporary dewatering structure to elevation 769 feet.
      g. Removal and salvage of each turbine and generator, tainter gates, and trash racks. The gates, racks, turbines, and concrete contain zebra mussels that are attached to these. The work includes disposal of the zebra mussels as directed by the Engineer.
      h. Demolition of the powerhouse, removal of portions of the embankment dam, and remainder of the soil and sediment upstream of the powerhouse and in the powerhouse forebay. Partial powerhouse demolition, embankment excavation, and the remainder of the soil/sediment excavation upstream of the powerhouse above elevation 769 feet shall be performed in the dry and below elevation 769 feet in the wet.
      i. Demolition of the abandoned fish ladder.
      j. Partial demolition of the corewall located on the upstream side of the embankment dam, and regrading of the embankments to cover portions of the corewall not required to be demolished and removed.
      k. Removal of equipment used for operation of the powerhouse.
      l. Sampling of wiring and roofing materials for asbestos.
D. RIVER RESTORATION SUMMARY:

1. A large deposit of sediment has accumulated in the upstream portion of the Brown Bridge Pond (Impoundment), as noted on the Drawings. The intent is to excavate a corridor through this sediment, wasting material in adjacent disposal areas as noted, to expose the pre-dam Boardman River channel. The average channel dimensions used for grading are a 55 foot wide channel bottom width, 2.8 foot (average) bankfull depth, and a total of 40 feet of floodplain in alternating widths between the left and right banks. All cut slopes are 3H:1V (horizontal to vertical) unless steeper native slopes are encountered.

2. The depth of sediment accumulation in the upper impoundment above Station 88+50 has been quantified and found to be largely sand. The nature and extent of material between approximately Station 88+50 to 50+00 is unknown and will be revealed during drawdown of the pond, but work will occur in this area. Grades between Station 50+00 and 13+00 appear to match pre-dam river slope and sediment accumulation in the lower portion of the impoundment appears to be minimal. Accumulated material has been quantified along the face of the dam embankment, approximately Stations 13+00 to 5+00. Additional material may accumulate here during drawdown.

3. As finished grades are reached indicators such as the gravel bed of the pre-dam channel and stumps of trees along the banks will help guide detailed grading as the old river channel is exposed. Additional restoration including the enhancement of pool and riffle features and the addition of large wood habitat may occur if budgets allow, but are considered additive items for bidding.

4. Sediment removal may occur under the most efficient means possible, including mechanical, hydraulic, or otherwise. The contractor will provide a detailed submittal of the means and methods for excavation and sequencing using the lowest cost and most effective method. The approach utilized must minimize the transport of sediment into “intact” downstream areas both within the footprint of the impoundment and downstream of the dam to the extent feasible. Sediment traps will be used to collect material that will mobilize through the work area as an additional control to minimize sediment transport. Controlled drawdown of the headpond will also be used to minimize sediment transport. Some sediment is expected to mobilize and be transported within the work area and downstream of the dam as part of the project.

E. A final topographic survey of the Limits of Work as shown on the Drawings shall be developed of the restored river channel.

1.2 DEFINITIONS

A. “Engineer” as used in the Specifications/Drawings shall mean AMEC Environment and Infrastructure, Inc. (AMEC) and/or Inter-Fluve, Inc.

B. “Owner” as used in these Specifications and Drawings shall mean the Boardman River Dams Settlement Agreement Implementation Team.

C. “Contractor” as used in the Specifications and Drawings shall mean the successful bidder selected by the Owner to perform portions of the Work described in the Specifications and Drawings, including selective demolition of the Powerhouse and river restoration.

D. “Notice to Proceed” as issued by the Engineer shall mean notice to the Contractor to commence on-site construction activities. Issuance is dependent on having an executed agreement and work order in-place.

E. “Substantial Completion” shall be granted by the Engineer and consists as the time when, in the opinion of the Owner and Engineer, the Work is sufficiently complete, in
accordance with the Contract Documents, so that the Work can be utilized for the purposes for which it is intended.

F. “Final Completion” shall be granted by the Engineer when all Work identified in the Substantial Completion punch list has been completed as verified by a Final Completion Site Inspection and all other tasks associated with project closeout have been completed to the satisfaction of the Engineer.

1.3 WORK COVERED BY THE SPECIFICATIONS AND DRAWINGS

A. The following permits have been applied for:
1. Joint Application Permit from the Michigan Department of Environmental Quality.
2. Soil and Sedimentation Control Permit (Part 91) from the Grand Traverse County Drain Commissioner.

B. The Work for this contract includes:
1. Obtain permits as follows:
   a. Demolition permit from the Grand Traverse County Construction Codes Department, and submit a notification (Notice of Intent to Renovate/Demolish) to MDEQ at least 10 working days prior to the demolition date. Prior to application for the demolition permit, a NESHAP report (40CFR Part 61, Subpart M) must be completed.
   b. Any other permits that may be required.
2. At existing headpond elevation (approximately 789.2 feet) set up all controls on-site, including erosion and sedimentation controls. Complete preliminary grading in the upper impoundment and sediment traps.
3. Sampling and analysis of powerhouse wiring and roofing materials for existence of asbestos containing material (ACM).
4. Drawdown of headpond to elevation 786.5 feet through the powerhouse tainter gates and then to elevation 783.5 feet through the turbine wicket gates and turbines in accordance with the project Interim Drawdown Plan at a rate of no greater than 6-inches per day or as dictated in the approved Joint Permit Application (JPA).
5. Drilling of two investigative borings, one soil boring and one concrete coring, at locations shown on the Drawings.
6. Upgrade of access roads, as necessary, by installation of up to 12-inches of aggregate base for construction access to the south and north reservoir rim. Protection and maintenance of all stream crossings along the access road alignment. Installation of temporary work mats to provide crossing of low-lying areas.
7. Installation of temporary sedimentation basin upstream of the left embankment.
8. Excavation of soil upstream of the powerhouse in the intake/forebay to Station 4+50 from elevation 783 feet to elevation 768 feet. Excavation shall be performed in the wet. Spoils shall be placed within the limits of the sedimentation basin and placed as final backfill at the spoils area located immediately south of the sedimentation basin berm.
9. Inspection of sill at the temporary powerhouse opening, and removal of sills as necessary to provide tight seal between sheeting and powerhouse face.
10. Installation of temporary dewatering structure upstream of the powerhouse.
11. Dewatering of temporary dewatering structure and processing water through the sedimentation basin.

13. Install temporary sediment traps in upper and lower impoundment.

14. Excavation and grading of proposed channel in upper impoundment with pond between elevation 789 feet and 783.5 feet.

15. Excavation and grading of proposed channel in lower impoundment with pond between below elevation 783.5 feet.

16. Drawdown of the pond elevation at the dam through the temporary dewatering structure to elevation 769 feet at a rate of no more than 6-inches per day or as dictated in the approved JPA.

17. Removal and salvage (for sale purposes) each turbine and generator.

18. Demolition of the powerhouse, removal of portions of the embankment dam, and remainder of the soil and sediment upstream of the powerhouse and in the powerhouse forebay. powerhouse demolition, embankment excavation, and the remainder of the soil/sediment excavation upstream of the powerhouse above elevation 769 feet shall be performed in the dry and below elevation 769 feet in the wet.

19. Excavation of the floodplain on each side of the channel; excavation shall be performed in the dry.

20. Performance of final surface restoration, including restoration of the access roads to pre-construction conditions, or as otherwise directed by the Engineer.

1.4 WORK SEQUENCE

A. The Work shall be planned, scheduled, and performed in stages in order to complete the Work within the requirements of the Specifications and Drawings and the requirements of appropriate regulatory agencies and permits.

B. The sequence shall be in the general sequence described by Drawing G-002.

C. Project Closeout:
   1. Request a Certificate of Substantial Completion;
   2. Perform a Site Inspection with the Engineer to accept work and identify remaining work to be completed (punch list);
   3. Complete all remaining work noted in the punch list;
   4. Perform a Final Site Inspection with the Engineer to verify all work is complete;
   5. Submit final record documents to the Engineer;
   6. Complete final pay requisition with accompanying balancing change order as required; and
   7. Achieve Certificate of Final Completion.

1.5 OTHER GENERAL REQUIREMENTS

A. Comply with all project related permits and apply/obtain all Contractor responsible permits prior to the commencement of work.

B. Make arrangements for temporary storage of materials and supplies and for timely delivery to the project site.

C. Assist the Engineer and the Owner as required in the review of construction.

D. Maintain up-to-date records on-site.

E. Maintain the Limits of Work in a neat condition.

1.6 SUBMITTALS

A. The Contractor shall submit the following items to the Engineer in accordance
with Section 01 33 00:
1. Sequencing Plan: Project sequencing plan, including sequence, means, methods, equipment, and schedule for the project work scope.
2. Temporary Dewatering Structure Plan and Design: Submit shop drawings showing fabricated details of the Engineer’s temporary dewatering structure, or design and details of alternated dewatering structure that might be proposed by the Contractor. Alternative design shall be sealed by a Professional Engineer licensed in the State of Michigan.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 HEALTH AND SAFETY
A. The Contractor is responsible for developing a Site-Specific Health and Safety Plan (HASP) for its operations. The Subcontractor shall perform the work in accordance with 29 CFR 1910, and implement this plan taking precautions as necessary to protect the public and work force personnel from potential hazards.

3.2 PROTECTION OF PROPERTY AND OPERATIONS
A. The project will occur within the Brown Bridge Quiet Area. A property manager residence is located on the south end of the dam. No other residences are in close proximity of the work area. The Boardman River is a heavily utilized recreational river with watercraft and fisherman moving through the river. Signage will be in-place notifying users of the project, but the Contractor is notified of the potential for the general public to enter the work area through the river corridor.
B. The Contractor shall utilize every precaution to protect the property from damage during execution of the Work. Any damage that the Contractor may inflict shall be repaired or replaced in a prompt manner as directed by Engineer at no additional cost to the Engineer or the Owner.
C. The Contractor shall take all measures required to minimize adverse impacts from execution of the work on property abutters and shall not interfere with their operations.
D. The Contractor shall coordinate site restrictions and vehicular/pedestrian traffic control plans as appropriate.

3.3 CONTRACTOR'S USE OF PREMISES
A. The Contractor shall use only those designated areas of the Site for staging and storage. Staging and storage areas are to be agreed upon and accepted by the Engineer and the Owner.
B. The Contractor shall assume full responsibility for the protection and safe keeping of products and equipment under this Contract that are stored on-site during the project construction.

3.4 OTHER REQUIREMENTS
A. The Contractor is responsible for using special care and or special considerations which may be necessary for proper execution of the work, but which may not be specifically identified in this section. The Contractor shall comply with the entire requirements of the
Specifications and Drawings and shall exercise special care wherever required for proper execution of the intended work of this contract.

B. The Contractor shall comply with all the requirements of any necessary permits.
C. Work of others at the Site is not to interfere with Contractor schedule.

END OF SECTION
SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION
A. This section covers the requirements for measurements and records for payment purposes for Contractor items, selective demolition of Brown Bridge Dam powerhouse, restoration of the Boardman River channel and surrounding areas. This section also describes measurement and payment for work to be completed under each Subcontractor bid item, including allowances, contained on the Bid Schedule. Work specified, but not specifically designated as a bid item to be measured or paid for, shall be incidental to all bid items.
B. Payment procedures shall be as described in the terms of the Contract between Engineer and the Contractor.

1.2 SCOPE OF PAYMENT
A. Payments to the Contractor shall be made for the actual quantities of the contract items performed and accepted in accordance with the Contract Documents, subject to the following restrictions and clarifications. Under no circumstances shall the stated quantities for a particular item of Work be exceeded without prior written approval from the Engineer in accordance with the procedures specified in the Contract Documents. Upon completion of construction, if the actual quantities show either an increase (as authorized by the Engineer) or a decrease from the quantities given in the Bid, the contract unit prices will still prevail, except as provided hereinafter.
B. The Contractor shall accept compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work and until its final acceptance by the Engineer; and for all risks of every description connected with the prosecution of the Work, except as provided herein; also for all expenses incurred in consequence of the suspension of the Work as herein authorized.
C. No extra payment shall be made to the Contractor for any delays caused by weather conditions beyond that described, lack of progress, defective workmanship, or rescheduling of work by other contractors, subcontractors, or equipment and material suppliers.
D. Additional costs caused by ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional services of Engineer, shall be paid for by the party causing the rejected or nonconforming work.
E. Work done on written instructions of Engineer, other than defective or nonconforming work, will be paid for by the Engineer, subject to the provisions of the Contract Documents.

1.3 PAYMENT FOR INCREASED OR DECREASED QUANTITIES
A. When alterations in the quantities of work, as herein provided for, are ordered or otherwise authorized by the Engineer and performed, the Contractor shall accept payment in full at the contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work will require modifications to the Contract through Change Orders and will be paid for as stipulated in such Change Orders as approved by the Engineer.
1.4 ELIMINATED ITEMS

A. Should any unit price items contained in the Bid Schedule be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such unit price items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

B. Should any equipment, material, or work be eliminated under a lump sum item, a Change Order shall be issued as stipulated in the Contract Documents, including the terms of the Agreement between the Engineer and Contractor. A Change Order shall not be required for the complete elimination of a lump sum bid item.

1.5 FINAL PAYMENT

A. The Contractor shall prepare, as soon as practicable after the entire completion of the project, a final quantity invoice of the amount of the Work performed and the value of such work, and submit to the Engineer.

1.6 INCIDENTAL WORK

A. Incidental work items for which separate payment is not measured include, but are not limited to, the following items:

1. Cleanup and disposal of construction debris and general site trash generated during execution of the Work;
2. Restoration of property;
3. Traffic control and signage;
4. Cooperation and coordination with other contractors, the property owners, regulatory agencies, and others;
5. Utility crossings and relocations, unless otherwise paid for;
6. Minor items - such as repairs to existing fence section, etc.; and
7. Coordination with and inspection by emergency response entities.

B. All incidental work items associated with the specified Work shall be accounted for in one or more of the bid items.

1.7 DESCRIPTION OF PAY ITEMS

A. General:

1. The pay items listed below describe the measurement of and payment for the Work to be done under the respective items listed on the Bid Schedule. The components of Work include specialty items involving:
   a. Work Plans, Submittals, and Quality Control.
   b. Mobilization/Demobilization.
   c. Temporary Facilities.
   d. Dam Demolition (Items 4.0 to 4.6).
   e. River Channel and Floodplain Restoration (Items 5.0 to 5.4).
   f. Revegetation (Items 6.0 to 6.2).

2. Each unit or lump sum price stated in the Bid shall constitute full compensation, as herein specified, for each item of the Work completed.

B. Bid Item 1.0: Work Plans, Submittals, and Quality Control.

1. Bid Item 1.0 shall be paid for at the Contract lump sum price.

2. Includes provision of all labor, materials, equipment, and incidentals necessary to completely and properly furnish items in accordance with the Specifications and Drawings and as described below, including, but not limited to:
   a. Project work plans.
   b. Submittals.
   c. Construction Quality Control, including field and laboratory testing, and
reporting.

d. Daily and weekly reports.
e. Obtaining any and all permits required to perform the intended scope of work.

C. Bid Item 2.0: Mobilization/Demobilization.
   1. Bid Item 2.0 shall be paid for at the Contract lump sum price.
   2. Provide all labor, materials, equipment, and incidentals necessary to completely and properly furnish items in accordance with the Specifications and Drawings and as described below, including, but not limited to:
      a. Bonds and insurance.
      b. Mobilization of personnel and equipment.
      c. Site restoration of disturbed areas.
      d. Final site cleanup.
      e. Demobilization.
      f. Project closeout.
      g. Other work not specifically included in other items including: compliance with applicable regulatory requirements; preconstruction and construction period planning; scheduling, reporting, administration, and documentation; and spill control.

D. Bid Item 3.0: Temporary Facilities and Controls.
   1. Bid Item 3.0 shall be paid for at the Contract lump sum price.
   2. Provide all labor, materials, equipment, and incidentals necessary to completely and properly furnish items in accordance with the Specifications and Drawings and as described below, including, but not limited to:
      a. Temporary utilities.
      b. Temporary facilities and controls.
      c. Environmental control measures.
      d. Decontamination pad.
      e. Staging and storage areas.
      f. Temporary (initial and interim) erosion and sedimentation controls.

E. Bid Item 4.0: Dam Demolition - Demolish Powerhouse, Log Sluice, Wingwalls, Fish Ladder and Part of Corewall.
   1. Bid Item 4.0 shall be paid for at the Contract lump sum price.
   2. Provide all labor, materials, equipment, and incidentals necessary for the demolition of the powerhouse. This item shall include the selective demolition of the powerhouse structure, wingwalls, log sluice, removal and salvaging of the generators and turbines, demolition and removal of the fish ladder, and removal and demolition of portions of the core wall as shown on Drawings. Price shall include any lead-based paint that may exist, and an asbestos containing material (ACM) that might exist in the roofing material and wiring.

F. Bid Item 4.1: Transportation and Off-site Disposal of Construction Debris.
   1. Bid Item 4.1 shall be paid for at the Contract unit price per ton.
   2. Provide all labor, materials, equipment and incidentals for the loading, transportation and disposal for any and all construction/demolition debris from the demolition powerhouse, wingwalls, log sluice, fish ladder, corewall, and any related appurtenances associated with the dam as indicated on the Drawings or encountered during the demolition of the powerhouse. Price shall include any lead-based paint that may exist, and an ACM that might exist in the roofing material and wiring.
   3. Payment will be made on submission and verification of weight tickets provided to the Contractor by the licensed waste disposal facility and submitted with proof.
of payment to the waste disposal facility by the Contractor. Copies of the weights and certification of disposal shall be submitted with the Contractor’s application for payment.

4. Contractor shall take all reasonable precautions to prevent the mixing of non-construction/demolition materials with the soil or materials not requiring off-site disposal.

G. Bid Item 4.2: Dam Demolition – Construction, Operation and Removal of Temporary Dewatering Structure.
1. Bid Item 4.2 shall be paid for at the Contract lump sum price.
2. Provide all labor, materials, equipment, and incidentals necessary for the construction, operation and removal of a temporary steel sheet pile dewatering structure as shown on the Drawings. This item shall include the design of the dewatering structure, including the stop-log gate structure, and submission of all shop drawings detailing fabrication of steel members or connections. Operation of the structure shall include removing stop gate logs as necessary to lower the elevation of the river upstream of the dam at a rate not to exceed 6-inches per day or as directed by the Engineer or as stipulated in the dam removal permit. The removal and pumping of water to a detention basin from elevation 783.5 to elevation 768 feet prior to operation of the stop-log gate structure is also included in this bid item.

H. Bid Item 4.3: Dam Demolition – Excavate Soil and Sediment in Powerhouse Forebay from Elevation 783 feet to elevation 768 feet.
1. Bid Item 4.3 shall be paid for at the Contract unit price per cubic yard of excavated soils and sediment placed in the designated spoil areas.
2. Provide all labor, materials, equipment, and incidentals necessary for excavation of soils and sediment to within the powerhouse intake/forebay area between Station 3+50 and 4+35. Excavation shall be performed in the wet and prior to installation of the temporary dewatering structure. Excavated soils and sediment shall be placed within the spoil area 7 as shown on the Drawings.
3. Payment shall be made based on pre- and post-placement surveys. These surveys shall be performed by a registered land surveyor licensed in the State of Michigan. The pre-placement survey shall be submitted to the Engineer prior to the placement of any soils but after any clearing and grubbing of the designated fill areas. Once the pre-placement survey has been reviewed and accepted by the Engineer, the Contractor will be authorized to use the spoil areas.

I. Bid Item 4.4: Dam Demolition – Excavate North and South Embankments.
1. Bid Item 4.4 shall be paid for at the Contract unit price per cubic yard of excavated soil placed in the designated spoil areas.
2. Provide all labor, materials, equipment, and incidentals necessary for excavation of soil within the limits of the embankment and within the channel between Stations 1+70 and 7+00. Excavated soils and sediment shall be placed within the spoil area 7 and 8 as shown on the Drawings.
3. Payment shall be made based on pre- and post-placement surveys. These surveys shall be performed by a registered land surveyor licensed in the State of Michigan. The pre-placement survey shall be submitted to the Engineer prior to the placement of any soils but after any clearing and grubbing of the designated fill areas. Once the pre-placement survey has been reviewed and accepted by the Engineer, the Contractor will be authorized to use the spoil areas.

J. Bid Item 4.5: Dam Demolition – Regrade Top of Embankments to Elevation 800 feet and cover Corewall.
1. Bid Item 4.5 shall be paid for at the Contract unit price per cubic yard of
excavated soil placed in the designated areas.

2. Provide all labor, materials, equipment, and incidentals necessary for excavation of soils along the crest of the embankment to elevation 800 feet, and shall include widening of the embankment crest to cover the abandoned portions of the corewalls. Excavated soil shall be placed on the upstream side of the embankments as shown on the Drawings.

3. Payment shall be made based on pre- and post-placement surveys. These surveys shall be performed by a registered land surveyor licensed in the State of Michigan. The pre-placement survey shall be submitted to the Engineer prior to the placement of any soils but after any clearing and grubbing of the designated fill areas. Once the pre-placement survey has been reviewed and accepted by the Engineer, the Contractor will be authorized to use the spoil areas.

K. Bid Item 4.6: Dam Demolition – Backfill Channel between Station 2+40 and 4+35.

1. Bid Item 4.6 shall be paid for at the Contract unit price per cubic yard of backfilled soil placed.

2. Provide all labor, materials, equipment, and incidentals necessary for backfilling of erosion resistant soil between Station 2+40 and 4+35 to allow in-place abandonment and burial of the powerhouse base slab tailrace apron.

3. Payment shall be made based on pre- and post-placement surveys. These surveys shall be performed by a registered land surveyor licensed in the State of Michigan. The pre-placement survey shall be submitted to the Engineer prior to the placement of any soils but after any clearing and grubbing of the designated fill areas. Once the pre-placement survey has been reviewed and accepted by the Engineer, the Contractor will be authorized to use the spoil areas.

L. Bid Item 5.0: River Channel and Floodplain Restoration – Excavate Soil and Sediment from River Channel and Floodplain and Backfill in Spoils Areas – Stations 88+50 to 133+00.

1. Bid Item 5.0 shall be paid for at the Contract unit price per cubic yard of excavated soils and sediment placed in the designated spoil areas.

2. Provide all labor, materials, equipment, and incidentals necessary for excavation of soils and sediments to restore river flow within the relic channel, including floodplain construction. This item shall include the construction of pilot channels, construction of sediment traps, and transportation and placement of excavated materials in spoil areas shown on the Drawings.

3. Payment shall be made based on pre- and post-placement surveys. These surveys shall be performed by a registered land surveyor licensed in the State of Michigan. The pre-placement survey shall be submitted to the Engineer prior to the placement of any soils but after any clearing and grubbing of the designated spoil areas. Once the pre-placement survey has been reviewed and accepted by the Engineer, the Contractor will be authorized to use the spoil areas.

M. Bid Item 5.1: River Channel and Floodplain Restoration – Excavate Soils and Sediment from River Channel and Floodplain and Backfill in Spoils Areas – Stations 56+00 to 88+50.

1. Bid Item 5.1 shall be paid for at the Contract unit price per cubic yard of excavated soils and sediment placed in the designated spoil areas.

2. Provide all labor, materials, equipment, and incidentals necessary for excavation of soils and sediments to restore river flow within the relic channel, including floodplain construction. This item shall include the construction of pilot channels, construction of sediment traps, and transportation and placement of excavated materials in spoil areas shown on the Drawings.

3. Payment shall be made based on pre- and post-placement surveys. These surveys
shall be performed by a registered land surveyor licensed in the State of Michigan. The pre-placement survey shall be submitted to the Engineer prior to the placement of any soils but after any clearing and grubbing of the designated spoil areas. Once the pre-placement survey has been reviewed and accepted by the Engineer, the Contractor will be authorized to use the spoil areas.

N. Bid Item 5.2: River Channel and Floodplain Restoration – Excavate Soils and Sediment from River Channel and Floodplain and Backfill in Spoils Areas – Stations 7+00 to 13+50.
1. Bid Item 5.2 shall be paid for at the Contract unit price per cubic yard of excavated soils and sediment placed in the designated spoil areas.
2. Provide all labor, materials, equipment, and incidentals necessary for excavation of soils and sediments to restore river flow within the relic channel, including floodplain construction. This item shall include the construction of pilot channels, maintenance of sediment traps, and transportation and placement of excavated materials in spoil areas shown on the Drawings.
3. Payment shall be made based on pre- and post-placement surveys. These surveys shall be performed by a registered land surveyor licensed in the State of Michigan. The pre-placement survey shall be submitted to the Engineer prior to the placement of any soils but after any clearing and grubbing of the designated spoil areas. Once the pre-placement survey has been reviewed and accepted by the Engineer, the Contractor will be authorized to use the spoil areas.

O. Bid Item 5.3: Large Wood, Logs – Bank Treatment Stations 3+80 to 5+80 and 11+00 to 12+00.
1. Bid Item 5.5 shall be paid for at the Contract unit price for each log placed.
2. Provide all labor, materials, equipment, and incidentals necessary for installation of large wood and logs as a bank treatment measure as shown on the Drawings.

P. Bid Item 5.4: Large Wood, Rootwads – Bank Treatment Stations 3+80 to 5+80 and 11+00 to 12+00.
1. Bid Item 5.4 shall be paid for at the Contract unit price for each log placed.
2. Provide all labor, materials, equipment, and incidentals necessary for installation of large wood and logs as a bank treatment measure as shown on the Drawings.

Q. Bid Item 5.5: Maintain Sediment Traps.
1. Bid Item 5.5 shall be paid for at the Contract unit price for each sediment trap maintained.
2. Provide all labor, materials, equipment, and incidentals necessary for excavation and maintenance of sediment traps within the headpond as shown on the Drawings. This item shall include maintaining the sediment trap as required to conduct the river channel restoration or as directed by the Engineer. Excavated sediment shall be placed in as shown on the Drawings.

R. Bid Item 6.0: Revegetation – Lower Impoundment Steep Slopes.
1. Bid Item 6.0 shall be paid for at the Contract unit price per acre.
2. Provide all labor, materials, equipment, and incidentals necessary for hydroseeding and mulching on exposed slopes as shown on the Drawings. This item shall include the installation of all soil amendments required for this work. Amendments, seed and mulch shall be installed as described in the Specifications and at the locations shown on the Drawings or as directed by the Engineer. Seed and mulch mixture shall be as described in the Specifications or as approved by the engineer. Also, included in this item is the maintenance and protection of seeded areas until revegetation has occurred.
3. Payment will be made at 50% at time of application and the remaining 50% after the vegetative material has been established and viable.
S. Bid Item 6.1: Revegetation – Lower Impoundment Floodplain Areas.
   1. Bid Item 6.1 shall be paid for at the Contract unit price per acre.
   2. Provide all labor, materials, equipment, and incidentals necessary for seeding and mulching of exposed floodplain in the Lower Impoundment areas as shown on the Drawings. This item shall include the installation of all soil amendments required for this work. Amendments, seed and mulch shall be installed as described in the Specifications and at the locations shown on the Drawings or as directed by the Engineer. Seed and mulch mixture shall be the floodplain mixture described in the Specifications or as approved by the Engineer. Also, included in this item is the maintenance and protection of seeded areas until revegetation has occurred.
   3. Payment will be made at 50% at time of application and the remaining 50% after the vegetative material has been established and viable.

T. Bid Item 6.2: Revegetation – Upper Impoundment Floodplain Areas.
   1. Bid Item 6.2 shall be paid for at the Contract unit price per acre.
   2. Provide all labor, materials, equipment, and incidentals necessary for seeding and mulching of exposed floodplain in the Upper Impoundment area as shown on the Drawings. This item shall include the installation of all soil amendments required for this work. Amendments, seed and mulch shall be installed as described in the Specifications and at the locations shown on the Drawings or as directed by the Engineer. Seed and mulch mixture shall be the floodplain mixture described in the Specifications or as approved by the Engineer. Also, included in this item is the maintenance and protection of seeded areas until revegetation has occurred.
   3. Payment will be made at 50% at time of application and the remaining 50% after the vegetative material has been established and viable.

1.8 ALLOWANCES
   A. Certain materials and equipment are specified in the Contract Documents by allowances. These allowances include furnishing and installation. If necessary, additional requirements will be issued by Change Order.
   B. Types of allowances:
      1. Unit cost allowances
   C. Requirements for Unused Materials
      1. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Engineer, after installation has been completed and accepted.
      2. If requested by Engineer, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Engineer, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.
   D. Examination
      1. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.
   E. Preparation
      1. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.
   F. Schedule of Allowances
      1. Allowance No. 1: Include allowance for “Reclaimed Native Gravel” for use as channel stone for reinforcement and stabilization of the surface of the channel at the powerhouse and dam as described in Section 31 23 00 “Earthwork”.
Allowance shall include all material, equipment and labor required for installation of material found on-site.

2. Allowance No. 2: Include allowance for “FES Bank Treatment – Station 2+00 to 4+00” through the dam embankment and as described in Section 31 35 33 “Fabric Encapsulated Soil – Bank Treatment”.

3. Allowance No. 3: Include an allowance for Large Wood as noted in Section 31 35 36 “Large Wood.” Allowance should include the following subitems:
   a. 3a: Large Wood, Logs, furnished and installed in Upper Impoundment.
   b. 3b: Large Wood, Rootwads, furnished and installed in Upper Impoundment.
   c. 3c: Large Wood, Logs, transported and staged in Upper Impoundment.
   d. 3d: Large Wood, Rootwads, transported and staged in Upper Impoundment.
   e. 3e: In-Stream Habitat Enhancement – Hourly Rate for Excavator, Track Dump and Operators.


PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

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SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including other Division 01 Specification Sections, apply to this Section.

1.2 DESCRIPTION
   A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following: Contractor’s construction schedules (preliminary and final) and daily reports.

1.3 DEFINITIONS
   A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
      1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
      2. Predecessor Activity: An activity that precedes another activity in the network.
      3. Successor Activity: An activity that follows another activity in the network.
   B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
   C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
   D. Event: The starting or ending point of an activity.
   E. Float: The measure of leeway in starting and completing an activity.
      1. Float time is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
      2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
      3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
   F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
   G. Major Area: A story of construction, a separate building, or a similar significant construction element.
   H. Milestone: A key or critical point in time for reference or measurement.
   I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
   J. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.
1.4 SUBMITTALS
A. Unless stated otherwise, all submittals can be provided to the Engineer in Microsoft Windows-compatible electronic format via email in lieu of hard copies.
B. Submittals Schedule: Contractor shall coordinate submittals in accordance with a schedule approved by the Engineer.
C. Preliminary Construction Schedule: Contractor shall provide a Preliminary Construction Schedule to Engineer upon award of contract.
D. Contractor's Construction Schedule: Contractor shall provide Construction Schedule to Engineer for approval prior to start of field work. Contractor shall track and modify the construction schedule on a weekly basis, with copies provided weekly to the Engineer or whenever schedule has been revised.
E. Daily Construction Reports: Submit copies at weekly intervals to Engineer.
F. Field Condition Reports: Submit copies to Engineer at time of discovery of differing conditions.
G. Special Reports: Submit copies at time of unusual event to Engineer.

1.5 COORDINATION
A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
B. Coordinate Contractor's Construction Schedule with the Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from parties involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE
A. In addition to the requirements specified below, refer to Section 01 33 00 “Submittal Procedures”.
B. Preparation: Coordinate with Engineer to develop a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
   1. Coordinate Submittals Schedule with Contractor's Construction Schedule.
   2. Initial Submittal: Submit concurrently with preliminary schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time.
      a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
   3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL
A. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
B. Activities: Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 30 days, unless allowed by Engineer.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date. Delivery dates indicated stipulate the earliest possible delivery date.
3. Contractor- and Subcontractor- Furnished Products or Services: Include a separate activity for each product or service to be furnished by the Contractor and Subcontractor. Include delivery or completion date. Delivery dates indicated stipulate the earliest possible delivery date.
4. Work Restrictions: Show the effect of the following items on the schedule (as applicable):
   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use of premises restrictions.
   g. Seasonal variations.
   h. Environmental control.
5. Work Stages: Indicate important stages of construction for each major portion of the Work, including the following (as applicable):
   a. Subcontract awards.
   b. Submittals.
   c. Purchases.
   d. Mockups.
   e. Fabrication.
   f. Sample testing.
   g. Deliveries.
   h. Installation.
   i. Tests and inspections.
   j. Adjusting.
   k. Curing.
   l. Startup and placement into final use and operation.
6. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities.
D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, demonstrate the effect of the proposed change on the overall project schedule.

F. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE
A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within 14 days of date established for commencement of the Work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)
A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Preliminary Network Diagram: Submit diagram within 14 days of date established for commencement of the Work. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, resource-loaded, time-scaled CPM network analysis diagram for the Work. Show CPM on all schedules.
   1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than seven days after date established for commencement of the Work.
      a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Engineer's approval of the schedule.
   2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
   3. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
   1. Contractor or Subcontractor and the Work or activity.
   2. Description of activity.
   3. Principal events of activity.
   4. Immediate preceding and succeeding activities.
   5. Early and late start dates.
   6. Early and late finish dates.
   7. Activity duration in workdays.
8. Total float or slack time.

F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
5. Changes in the critical path.
6. Changes in total float or slack time.

2.5 REPORTS
A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial Completions.
19. Substantial Completions authorized.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS
A. General: Submit special reports directly to Engineer within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Engineer in advance when these events are known or predictable.
PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue revised schedule at least one work day before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate known or estimated Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Engineer, testing and inspection agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.

2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION
SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor shall furnish all labor, equipment, and materials necessary to demonstrate that their proposed products/materials and their proposed means/methods of construction conform to the intent of the design.

1. The Contractor shall forward to the Engineer the project data, shop drawings, samples, certifications, manuals, and other submittals, as required in the Specifications.

2. The Engineer shall perform formal reviews of submittals with input from Contractor as needed.

B. The requirements included in this Section supplement those included in Section 01 11 00 “Summary of Work”. Where conflicts exist between the two Sections, the requirements of this Section shall govern.

C. Required Submittals are identified in each technical specification section of the Contract Documents. Submittals shall be provided to the Engineer, as required, unless otherwise specified. Submittals may include:

1. Data;
2. Drawings;
3. Instructions;
4. Schedules;
5. Statements;
6. Reports;
7. Plans;
8. Certificates;
9. Samples;
10. Records; and
11. Operation and Maintenance Manuals.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 11 00: Summary of Work.

B. Section 01 32 00: Construction Progress Documentation.

1.3 SCHEDULE

A. After Notice to Proceed has been issued, provide a Submittals Schedule showing the following itemized by Specification Section:

1. Dates that submittal items shall be provided for the Engineer’s review.

2. Dates by which the Contractor requires acceptance of the submittal for procurement, fabrication, and installation purposes.

B. The schedule shall allow for reasonable review cycles, and shall be consistent with the overall construction schedule.

C. No claims for schedule delays will be allowed for unresponsive submittals or failure to respond to comments in a timely manner by the Contractor.
1.4 PREPARATION OF SUBMITTALS

A. All shop drawing submittals shall follow the requirements as indicated in Section 01 32 00, “Construction Progress Documentation” at a minimum.

B. Review submittal items for legibility, conformance to the project, for coordination between work items, and for completeness according to submittal requirements of each Specification Section.
   1. Certify review by signing transmittal form.
   2. List/itemize any specific comments or requirements, as necessary.

C. Utilize the attached Transmittal Form to identify submittals and to provide information required in Owner/Contractor’s portion of form, including:
   1. Date of submittal.
   2. Project Name, Contract No., and Location.
   3. Submittal No.; numbered in sequence, beginning with 1.
   4. Contractor’s name, address, and contact person(s).
   5. Items within submittal, numbered in sequence.
   6. Specification Section No.
   7. Manufacturer/Designer/Supplier.
   8. Special Instructions (when response is needed, if there is a deviance, and etc.).
   9. Signature certifying that Contractor has reviewed the submittal (see subsection 1.4.B above).

D. Cross-reference actual items in submittal by labeling them clearly by the Item No. listed on the Transmittal Form; and provide them in the sequence listed.

E. If all the submittal items required for the Specification Section are not provided with the submittal, attach a memo explaining when the missing items will be provided.

F. Subcontractor shall provide electronic/email copies of submittals to the Contractor and Engineer. Contractor shall provide electronic/email copies of submittals to the Engineer.

G. Submittals may be transmitted electronically in “pdf” format for materials up to and including 11”x17”. Submittals containing materials that must be printed larger than 11”x17” to be legible shall be submitted in hard copy (two copies minimum). Submittals transmitted electronically do not require a hard copy follow up.

H. Send submittals to the Engineer to the following address:

AMEC Environment & Infrastructure, Inc.
Attn: Sandra Sroonian
41 Hughes Drive
Traverse City, MI 49686
Tel: 231-922-9050
E-mail: sandra.sroonian@amec.com

1.5 ENGINEER’S REVIEW

A. Upon receipt, the Engineer will log in submittals and review for conformance with the design intent.

B. The Engineer will review and return forms and comments via e-mail within approximately five workdays of receipt of submittal. The Engineer will expedite review of items noted critical by the Contractor. All other parties will receive a fax or electronic copy of the submittal response only.

C. The Engineer will log out submittal upon faxing, e-mailing, or sending review action, and will further distribute forms and comments within the Engineer as required for orderly progression of the project.
D. Review by the Engineer is for general conformance with design concept for the project and general compliance with the information given in the Contract Documents. The Engineer review action codes are listed below.
1. No Exceptions Taken (Code 1): Fabrication and installation may proceed.
2. Make Corrections Noted (Code 2): Contractor shall make the changes noted, and then may proceed with fabrication or installation.
3. Amend and Resubmit (Code 3): Contractor shall make the changes noted, and resubmit for an additional review cycle.
4. Rejected - See Remarks (Code 4): Contractor shall make the changes noted, which may involve a complete new product submittal, and resubmit for an additional review cycle.

1.6 RESPONSIBILITIES OF CONTRACTOR
A. The Engineer’s action code (described in subsection 1.5.D of this Section) does not relieve Contractor from responsibility of compliance with requirements of the Contract Documents. Contractor remains responsible for dimensions, job site correlation, fabrication processes, construction methods, and coordination of installation work.
B. Contractor shall promptly distribute submittal review actions and comments to its suppliers, and otherwise as required for orderly progression of the job, and shall modify or replace products to comply with the Engineer’s comments.
C. Products fabricated or installed before receiving Review Action Code 1 or 2 shall be modified or replaced at Contractor’s expense, to conform to the design intent, as directed by the Engineer. Products receiving Action Code 2, but not modified per the Engineer’s comments prior to installation, shall similarly be modified or replaced per the Engineer’s direction.

1.7 RESUBMISSION
A. Items receiving an Action Code 1 or 2 do not require resubmission, unless the original product becomes unavailable, or changes in the project make the original product incompatible.
B. The Contractor shall repeat the submittal process for items receiving an Action Code 3 or 4 (See subsection 1.5.D). The original submittal number shall be used with a letter code suffix appended in ascending order for each resubmission of the item.
1. The original submittal shall be number 1.
2. The first resubmission of that submittal shall be number 1A.
3. The second resubmission of that submittal shall be number 1B; and etc. (if required).
C. Contractor shall relate item numbers in resubmissions to prior submittals of that series. For example, if original submittal No. 1 items 1, 4, and 6 require resubmission, they should be provided as submittal No. 1A, items 1, 4, and 6.
D. The resubmission coding systems described above are designed to expedite review processes and simplify filing and retrieval for the Engineer, the Contractor, and the Field. When additional cross-referencing is required for the sake of clarity, the Contractor shall provide explanatory notes.
1.8 DOCUMENTATION
   A. Documentation provided in submittals shall be in adequate detail regarding dimensions,
capacities, durability, materials, connections, and interface for the Engineer to confirm
whether the products represented comply with the design intent.
   B. Documentation shall be organized to facilitate review and use.
      1. Reports and manuals shall have a table of contents in suitable detail for locating
required topics and attachments.
   C. Documentation shall be in proper form and format.
      1. For example, signed Certificates of Compliance shall be provided on
Manufacturer’s Letterhead with the information requested in the attached sample
form.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION
## TRANSMITTAL FOR ACCEPTANCE OF SHOP AND VENDOR DRAWINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Project Name and Contract No.</th>
<th>Location</th>
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<td>Brown Bridge Dam Removal and Restoration</td>
<td>Grand Traverse County, MI</td>
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To: AMEC Environment and Infrastructure, Inc.  
41 Hughes Drive  
Traverse City, MI 49686  
Attn: Sandra Sroonian  
Contractor/Vendor Job No.  

### No. Item Description Spec. Manufacturer/For MACTEC’s use  
Copies No. (Name, Type, Size, Capacity Use) Sect. No. Designer Action Code Review

### Acceptance Action Code:  
1. No exceptions taken  
2. Make corrections noted  
3. Amend and resubmit  
4. Rejected - see remarks  
   - Installation shall proceed only when acceptance code is #1 or #2.  
   - Acceptance does not relieve Contractor from responsibility of compliance with all requirements of the Subcontract documents.  
   - Acceptance coded #3 or #4 shall be resubmitted unless otherwise indicated.

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<th>Initial</th>
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<td>Project Assistance</td>
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Date Returned: ____________________  
by ____________________  
AMEC E&I, Inc.
(Sample)

MANUFACTURER'S LETTERHEAD
CERTIFICATE OF
COMPLIANCE
(Manufactured or Fabricated Material)

Date __________________________

WE HEREBY CERTIFY that

(Description, Kind of Material, Model No., etc.)

Furnished to

(Name of Contractor) (Prime or Sub.)

For Use On

(Project Name)

No. __________ Owner ______________________

In the Amount of

(Quantity Represented)

Identified By

(Label, Marking, Seal No., Consignment, or Waybill No.)

Shipped on _______________ 20__, Delivered on _______________ 20__.

Shipped Via

(Method of Shipment, Car No., Truck No.)

MEETS THE REQUIREMENTS OF THE PERTINENT PROJECT PLANS, SPECIAL
CONDITIONS AND SPECIFICATIONS OF THE SUBJECT PROJECT IN ALL RESPECTS.
PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW MATERIALS
ARE IN CONFORMANCE WITH ALL APPLICABLE SPECIFICATIONS, DRAWINGS
AND/OR STANDARDS OF ALL ARTICLES FURNISHED.

All records and documents pertinent to this certificate and not submitted herewith will be maintained
available by the undersigned for a period of not less than three years from the date of this certificate.

Manufacturer

Signed by __________________________

Typed Name __________________________

Title __________________________

--END OF SECTION--
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide such temporary facilities and controls as the Work may warrant. General locations as depicted on the Construction Drawings (Drawings) may be modified as required by the Contractor upon approval of the Engineer.

2. Required temporary facilities and controls to be furnished by the Contractor include:
   a. Shelter for crews including sanitary facilities conforming to local codes and OSHA requirements.
   b. Fire protection.
   c. Safety equipment.
   d. Vehicle barriers and work area barriers.
   e. Concrete barriers.
   f. Vehicle Decontamination pad.
   g. Pumping systems for dewatering and stormwater management.
   h. Clean water storage facility.
   i. Water pollution control.
   j. Erosion and sedimentation controls (see Section 31 25 00, Erosion and Sedimentation Controls).

3. Other facilities that may be necessary to provide, depending on the Contractor’s approach to the work and the preference of the Contractor, include, but are not limited to:
   a. Contractor’s office and storage facilities.
   b. Yard lighting.
   c. Construction warning, protection, and control devices for maintenance and safety of vehicular and pedestrian traffic.

4. Completely remove all temporary equipment and materials upon completion of the Work and repair all damage caused by the installation of temporary measures.

5. Make all necessary applications and arrangements for electric power, light, water and other utilities. Notify the local electric power company if unusually heavy loads, such as welders, will be connected.

B. Other Requirements:

1. Obtain permits as required by local governmental authorities for the work items to be completed by the Contractor.

2. Comply with the latest National Electrical Code.

3. Comply with all local, State, and Federal codes, laws, and regulations.

4. Allow access to and use of facilities provided by the Contractor to the Owner and Engineer.

C. Construction Utilities: No on-site utilities will be available to the Contractor. Contractor shall be responsible for obtaining all necessary power, electric, potable water, sanitary, gas, telecommunications and other services that may be necessary for completion of the work.
1.2 RELATED WORK SPECIFIED ELSEWHERE
   A. Section 01 11 00: Summary of Work.
   B. Section 02 42 09: Waste Removal, and Handling.
   C. Section 02 42 10: Off-Site Transportation and Disposal.
   D. Section 31 23 00: Earthwork.
   E. Section 31 25 00: Erosion and Sedimentation Controls.

PART 2 - PRODUCTS

2.1 MATERIALS
   A. Contractor's facilities shall be of size and content for adequate administration of the Contract, storage of materials required, and provision for personnel shelter.
   B. Equipment required for personal safety of workmen shall be furnished in full compliance with specific safety requirements of local, State, and Federal agencies, including OSHA.
   C. Traffic signs, barricades, warning lights, and all necessary equipment for the protection of the traveling public shall be furnished and maintained as specified in “Part 6, Temporary Traffic Control” of the Manual on Uniform Traffic Control Devices, 2003 Edition by the Federal Highway Administration.
   D. Vehicle/Work Area Barrier: Provide temporary fencing to separate vehicles and pedestrians from the active work area.
      1. Fence shall be polyethylene mesh, colored for high visibility (e.g. orange),
      2. Fence posts shall be galvanized metal T-posts of adequate length to provide full support of the installed fence fabric.
   E. Concrete Barrier: Shall meet the requirements of Special Provision for Temporary Concrete Barrier as defined by the Michigan Department of Transportation (MDOT) 03SP812 (G).
   F. Decontamination Pads: Submit decontamination Pad details as specified in Section 31 23 00, Earthwork.
   G. Any equipment operating within the river area shall utilize a non-petroleum based hydraulic fluid. Hydraulic fluid shall be Chevron Clarity or approved equivalent.

PART 3 - EXECUTION

3.1 PERFORMANCE
   A. Field Office, Storage Trailers, or Buildings: Sited in approved locations and properly set up for all anticipated weather conditions.
   B. Sanitary Conveniences for Project Personnel:
      1. Provide and maintain in sufficient numbers, for the use of all persons employed on the worksite at suitable locations, screened from public observation, in accordance with State and local ordinances.
      2. Rigorously enforce the use of the approved sanitary facilities provided.
      3. When no longer required, remove from the project area and properly dispose of the contents.
   C. Any temporary utility bypasses shall meet all local codes and capacity requirements.
   D. Provide sufficient drinking water for all employees from approved potable sources.
   E. Obey and enforce other local sanitary regulations and orders, taking such precautions against infectious diseases as may be deemed necessary.
   F. Conduct operations in a manner which, with the use of proper equipment provides maximum safety for workmen and the traveling public.
3.2 DECONTAMINATION PAD
A. Construct to facilitate the cleaning of equipment and trucks prior to leaving and entering the Site. Locate as close to the active work as possible to prevent tracking of contaminated material, including invasive plant species, beyond the limit of the designated Working Pad.
B. Decontamination Pad shall consist of an aggregate (stone/sand) working base, a geomembrane liner, and a collection sump and pumping system.
   1. The subgrade surface beneath the liner shall be free of stones, debris, or other objects greater than ½ inch in size.
C. Collect and dispose of fluids on site as directed by the Engineer.
D. Collect and invasive species waste and petroleum spill waste in a portable storage tank adjacent to the Decontamination Pad.
D. Invasive waste and petroleum spill waste treatment, transportation, and disposal shall be provided by the Owner/Contractor as described in Section 02 42 09, “Waste Removal and Handling” and Section 02 42 10, “Off-Site Transportation and Disposal.”
E. Owner/Contractor shall demolish and properly dispose of the Decontamination Pad off-site in accordance with all applicable regulations upon completion of the project.

3.3 TEMPORARY EROSION AND SEDIMENTATION CONTROLS
A. Temporary erosion and sedimentation controls shall be provided by the Contractor and located, installed, and maintained as shown on the Construction Drawings and described in Section 31 25 00, Erosion and Sedimentation Control. Contractor shall take care to protect all temporary erosion and sedimentation controls and shall notify Engineer immediately of any damage to such controls caused by Contractor’s personnel or equipment.

3.4 WATER POLLUTION CONTROL
A. Control of Oil, Grease, and Fuel From Heavy Equipment
   1. All equipment entering the project limits must be in good working order and free of fuel, oil, lubricants, or other fluid leaks. All equipment operating within the river channel shall be required to use a non-petroleum hydraulic oil to minimize impacts in the event of a spill. Any equipment potentially or actually discharging fluids shall be removed immediately from the project site.
   2. Spill response equipment including an oil absorbent boom and barrier shall be staged on the bank no less than 500 feet below the work area for immediate deployment across the entire channel. The Michigan Department of Environmental Quality (MDEQ) and all other regulatory agencies, as required, will be notified immediately of any spills. Any accidental spillage shall be cleaned up to the degree possible or excavated and disposed of in sealed drums following applicable regulations.
   3. All equipment servicing and maintenance including fueling, oil change and lubrication, shall occur at the decontamination pad area. The exception is the fueling of heavy tracked equipment which can be done within the project area a minimum of 300 feet from any open water. All waste materials associated with equipment operations including oil, lubricants, hydraulic fluids and trash, shall be disposed of outside the project area following MDEQ regulations.
   4. The Contractor, upon approval from the Engineer, shall remove all equipment from 10 feet above forecasted flood levels in the event of flooding. The potential for floods and flood levels shall be assessed daily by monitoring National Weather Service, River Forecast Center forecasts for the Boardman River.
significant flooding potential, greater than a bankfull event, is possible, equipment shall be removed from the river bank and beyond the 100 year floodplain limits as shown on the Drawings.

END OF SECTION
SECTION 01 57 20

TEMPORARY DUST AND ODOR CONTROL

PART 1 – GENERAL

1.1 DESCRIPTION
A. The Contractor shall execute the Work by methods that minimize the generation of dust and nuisance odors. Contractor shall employ dust control measures to minimize the creation of airborne dust during execution of the Work. At a minimum, standard dust control techniques shall be employed in areas of heavy equipment traffic such as watering down the site. The dust control measures will be such that, at a minimum, air quality is in compliance with applicable OSHA regulations.
B. The performance objective for odor control will be to control, eliminate, or mask any odors that generate complaints, from building tenants, neighboring residents, the public, state or local officials, or the Engineer.
C. No additional payments will be made to the Contractor due to delays or shutdowns as a result of emissions associated with the Contractor’s work, whether exceeding standards or posing a nuisance. If the initial emission controls are found to be inadequate, the Contractor shall provide additional measures.
D. Dust and odor control systems shall be implemented as necessary to meet local, State, and/or federal regulations for air emissions and dust and to control nuisance odors.
E. Sufficient volumes of water (may be taken from the river) and/or odor control foam shall be readily available or stored on site by the Contractor to address continuous application as necessary.

1.2 RELATED WORK SPECIFIED ELSEWHERE
A. Section 31 25 00: Erosion and Sedimentation Controls

PART 2 - PRODUCTS

2.1 MATERIALS
A. Water used for dust and odor control shall be free from oil, acid, and injurious alkali or vegetable matter, and other deleterious materials or contaminants. Water shall not be brackish.
B. Odor control foam. Odor control foam shall be a biodegradable, non-flammable, and non-toxic water-based material designed for the control of VOCs, dust, and odor. It shall be capable of being spray applied to form a uniform encapsulating layer between contaminated materials and the environment, suppressing volatile organic compounds (VOCs), dust, odors, and gas.

2.2 EQUIPMENT
A. Equipment for dust and odor control shall include appropriate measures (e.g., heat tape, tank heaters) to prevent freezing or impair operation due to temperatures below freezing.

PART 3 – EXECUTION

3.1 SPRINKLING WATER
A. Apply by approved methods and with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.
B. Disperse through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.
C. Apply water until the surface is wet, but avoid ponding, run off, or muddy conditions.

3.2 PAVEMENT SWEEPING
A. Maintain clean pavement surfaces within the designated work area and Site egress route. Do not permit construction equipment to track soil outside of the work area or on public roads.
B. Sweep pavement surfaces daily during construction to prevent migration of soil outside of the work area and to prevent the generation of dust.
C. Sweep all paved surfaces within the work area and truck ingress/egress routes at the end of construction as a final cleanup task to remove any residual construction debris and soils.

3.3 STOCKPILE MANAGEMENT
A. Maintain on-site stockpiles in a manner that prevents wind-blown dust generation. During active use, provide periodic water sprinkling and during inactive periods, cover stockpiles with weighted tarps.

3.4 ODOR CONTROL FOAM
A. Apply as directed by manufacturer. Manufacturer’s application instructions shall be available on site.

3.5 TESTING
A. All equipment, if not in regular use, shall be tested as requested by the Engineer.

END OF SECTION
SECTION 01 70 50

EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
      2. General installation of products.
      3. Progress cleaning.
      4. Starting and adjusting.
      5. Protection of installed construction.
      6. Correction of the Work.

1.3 RELATED WORK SPECIFIED ELSEWHERE
   A. Section 01 11 00: Summary of Work.
   B. Section 01 71 23: Field Engineering and Surveying.

1.4 SUBMITTALS
   A. Qualification Data: For any subcontractor.
   B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements and meet the requirements of Section 01 71 23.
   C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous or non-hazardous materials or construction debris, for disposal.
   D. Certified Surveys: Submit two copies signed by land surveyor in accordance with Section 01 71 23.
   E. Final Property/Site Survey: Submit three copies showing the Work performed and record survey data in accordance with Section 01 71 23.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
1. Before construction, verify the location and points of connection of utility services.
2. Before construction, verify the location and elevations of all structures within 100 feet of the work area, including retaining walls, bulkhead walls, catch basins, manholes, extraction wells, monitoring wells, and exposed foundations.
3. Before construction, the Contractor shall perform a detailed site survey to measure/characterize existing conditions and ground surface topography as specified in Section 01 71 23. This survey will extend within the limits of work as necessary.
4. Pre-construction survey of the upper impoundment shall extend to the valley wall between Stations 88+50 and 133+00. During drawdown a pre-excavation survey and staking of exposed impoundment areas shall be performed (Stations 50+00 to 85+00 and the width of work downstream of Station 15+00).

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, Contractor’s surveyor shall investigate and verify the existence and location of underground utilities and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Contractor shall examine substrates, areas, and conditions, with subcontractors present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   a. Description of the Work.
   b. List of detrimental conditions, including substrates.
   c. List of unacceptable installation tolerances.
   d. Recommended corrections.
2. Contractor shall examine walls, floors, and roofs of existing structure to remain to confirm that construction methods will not detrimentally impact the structures.
3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION
A. Existing Utility Information: Contractor shall furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Owner/Contractor shall coordinate with authorities having jurisdiction.
B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to
Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT
A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
B. General: Contractor shall engage a land surveyor to lay out the Work using accepted surveying practices in accordance with Section 01 71 23. Contractor shall coordinate with Contractor’s surveyor to accomplish the following:
   1. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   2. Inform installers of lines and levels to which they must comply.
   3. Check the location, level and plumb, of every major element as the Work progresses.
   4. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
   5. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction and as specified in Section 01 71 23.
C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
D. Building Lines and Levels: Locate and lay out control lines and levels for structures, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING
A. Identification: Contractor will identify existing benchmarks, control points, and property corners.
B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
   1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
   2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
C. Benchmarks: Contractor shall coordinate with surveyor to establish and maintain a minimum of three permanent benchmarks in accordance with Section 01 71 23. Comply with authorities having jurisdiction for type and size of benchmark.
D. Certified Survey: On completion of major site improvements, and other work requiring field-engineering services, Contractor shall coordinate with surveyor to prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work in accordance with Section 01 71 23.
E. Final Property Survey: Contractor’s surveyor shall prepare a final site survey showing significant features (real property) for Project in accordance with Section 01 71 23.

3.5 INSTALLATION
A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
B. River Restoration: Lines and grades indicated on the plans are approximate between sections and are expected to deviate within a range consistent with the restoration of the natural channel and floodplain. Natural features do not adhere to straight lines and exact elevations. As such, field adjustment of both disposal areas and excavation elevations are expected to occur during work to restore the natural landscape variability to the extent reasonable. The Engineer will provide oversight and approval during excavation that final grades and elevations are acceptable.
C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
F. Tools and Equipment: Do not use tools or equipment that produces harmful noise levels.
G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
H. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
   2. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING
A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
   2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
B. Site: Maintain Project site free of waste materials and debris.
C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING
A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION OF INSTALLED CONSTRUCTION
A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK
A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.
PART 1 - GENERAL

1.1 DESCRIPTION

A. Established existing survey control points are available on-site for construction purposes as described on Drawing G-002. The Contractor shall verify locations of survey control points prior to starting work. The Contractor shall safeguard all survey control points. Should any of these points be damaged or destroyed, the Contractor shall replace the control point at no cost to the Owner. The Contractor shall assume the entire expense of rectifying work improperly constructed due to failure to maintain and protect such established survey control points.

B. The Contractor shall be responsible for the layout of the construction and any additional survey control points, grid coordinate locations, lines, grades, and levels necessary for the proper construction and testing of the work required in the Contract Documents. Survey control shall be used at a minimum to maintain established layout, specified slopes, specified depths, and specified thicknesses.

C. The Contractor shall employ a surveyor using standard practices and datum for the State of Michigan to provide the surveying functions necessary for the proper execution of the work, to provide measurement for payment, and to document and record the final completed work.

D. The Contractor is responsible for scheduling the surveys to coincide with construction activities. If the survey documentation shows improper locations, slopes, elevations, or layer thicknesses, the Contractor shall correct the deficiency and re-survey the re-work at no additional cost to the Owner. Survey documentation may include, but not be limited to:

1. Initial field verification survey, as described in subsection 1.3 of this Section.
2. Location and elevation of the existing powerhouse, embankment dam, and ancillary structures.
3. Limit of work.
4. Intermediate surveys to establish existing and final grades within the impoundment as the headpond is drawn down.
5. Final constructed topography within the limit of grading based on a 10 feet maximum grid pattern or as required to establish 1-foot contours.
6. Location and elevation of Contractor established survey control points and/or benchmarks.
7. New soil boring and concrete core locations and elevations.

E. The limits of wetlands on site have been previously surveyed by the Owner and Engineer. Prior to construction, the Engineer will confirm that wetland limits are identifiable on site, and will supplement flagging as necessary.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 11 00 – Summary of Work.
B. Section 01 33 00 – Submittal Procedures.
C. Section 01 77 00 – Closeout Procedures.
1.3 SUBMITTALS
A. On request, submit data demonstrating qualifications of persons providing field engineering and survey services.
B. On request, submit documentation verifying accuracy of survey work.
C. The Contractor shall perform a field verification of survey as part of the work prior to the start of construction activities to verify/establish current conditions. The Contractor shall then compare the existing condition information shown on the Construction Contract Drawings to the current conditions determined during the field verification activities. Where discrepancies exist, the Contractor shall submit to the Engineer the results of the field verification survey and results of the comparison with the Construction Contract Drawings. All discrepancies shall be resolved by the Engineer prior to initiation of construction activities affected by discrepancies.
D. Survey data in support of quantity measurements as required in Section 01 22 19, Price and Payment Procedures.
E. Survey data and measurements as the Work progresses for the project in support of establishing As-Built Drawings and Record Drawings as specified in Section 01 77 00.

1.4 FIELD ENGINEERING AND SURVEY REQUIREMENTS
A. Provide field engineering and survey services using appropriate construction practices. Use skilled persons, trained and experienced in the necessary tasks and techniques for the proper execution of the Work. Locate and layout the Work by survey instrumentation and similar appropriate means.
B. The Contractor shall sufficiently establish the existing ground elevations before earthwork is started.
C. The Contractor shall perform the layout and shall document completed construction on As-Built Drawings, including the features listed in subsection 1.1D.
D. The Contractor shall sufficiently survey to verify quantities included in requests for payment.
E. Vertical and horizontal control shall be of sufficient accuracy and precision to assure survey work is constructed and recorded to within 0.1 foot tolerance.
F. Verification surveys, surveys for measurement and payment, and project As-Built documentation shall be provided in electronic file format compatible with AutoCAD 2007 or later and Adobe Acrobat 6.0 or later.

1.5 TECHNICAL REQUIREMENTS OF SURVEY
B. Map Accuracy - Ninety percent of the elevations determined from the solid-line contours for the topographic maps shall have accuracy with respect to true elevation of 0.5 contour interval (0.5 foot) or better, and the remaining 10 percent of such elevations shall not be in error by more than one contour interval (1 foot).
C. Vertical Control: Establish a permanent project benchmark for vertical control.
D. Horizontal Control: Each horizontal control point shall be plotted on the map within the coordinate grid in which it should lie to an accuracy of one-hundredth foot (0.01 foot) of its true position as expressed by the plane coordinates computed for this point.
E. Spot Elevations: Survey shall be constructed to provide an accuracy of 0.1 feet vertically. No shots exceeding 500 feet shall be taken. Ninety percent of all spot elevations placed on the maps shall have an accuracy of at least 0.1 foot, and the remaining 10 percent shall not be in error by more than one-half (1/2) of the contour interval (0.5 foot).
F. Accuracies and accuracy tests apply to the stereo compilation scale of the original manuscript (i.e., if the manuscript is compiled at a scale of 1 inch = 100 feet and then
reduced to 1 inch = 200 feet, then the accuracies will apply to the original 1 inch = 100 feet scale). This is also true if the manuscript is enlarged to 1 inch = 50 feet or some larger scale.

1.6 EXISTING CONDITIONS SURVEY
A. The existing conditions depicted on the Construction Contract Drawings are based on multiples surveys, referenced as shown on Drawing G-002.

1.7 CONSTRUCTION CONTRACT DRAWINGS
A. The Engineer will supply the Contractor with electronic drawing files in AutoCAD 2010 file format. These electronic files may be used by the Contractor for calculating construction layout and as a base map for As-Built survey.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION
SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION
A. Keep accurate record documents for all additions, substitutions of material, variations in work, and any other revisions to the Contract Documents.
B. Provide a final survey of project Site and as-built drawings of the completed work.

1.2 RELATED WORK SPECIFIED ELSEWHERE
A. Section 01 11 00: Summary of Work.
B. Section 01 33 00: Submittal Procedures.

1.3 PROJECT CLOSEOUT
A. The Contractor shall comply with the procedures stated in the General Conditions of the Contract for issuance of Certificate of Substantial Completion.
B. The Contractor shall submit written certification that the Work is complete in accordance with Contract Documents and ready for the Engineer’s inspection/review.
C. Provide submittals as required by these Specifications.
D. Develop, document, and complete Substantial Completion punch list of items that require completion prior to demobilization of the site.

1.4 FINAL CLEANING
A. Execute final cleaning of Site prior to final project inspection.
   1. Clean and remove debris from drainage systems.
   2. Clean project Site areas, including sweeping paved areas and raking landscaped surfaces.
   3. Remove waste and surplus materials, rubbish, and temporary facilities and controls from the Site.

1.5 WARRANTIES
A. Provide duplicate notarized copies of all warranties associated with the work.
B. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
C. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 14 business days after acceptance, listing the date of acceptance as start of warranty period.

1.6 MAINTENANCE OF RECORD DOCUMENTS
A. Record documents shall be stored in a dry, safe place apart from Construction Documents, and be available for inspection by the Engineer. The record documents shall not be used for construction purposes.
B. Clearly label each document “Project Record.” During the execution of the work, keep record documents current.
C. Provide files and racks for storage of documents.
D. Maintain one copy of the following documents at the job site:
   1. Drawings showing progress of work;
   2. Specifications;
Brown Bridge Dam Removal and Restoration Specifications
May 10, 2012

3. Addenda;
4. Reviewed submittals;
5. Change Orders;
6. Other modifications to the Contract;
7. Health and Safety Plan;
8. Owner/Contractor Quality Control Plan
9. Work Plan(s);
10. Applicable permit documents;
11. Owner/Contractor’s certifications;
12. Shop drawings and product data;
13. Daily reports, including:
   a. Records of all site work;
   b. Inspection records; and
   c. Reports on any emergency response actions.
14. Construction photographs;
15. Deficiency reports;
16. Sampling documentation, chain of custody forms, and waste manifests;
17. All analytical laboratory testing data (Contractor generated);
18. All geotechnical laboratory testing data and construction materials field/laboratory
   testing reports (Contractor generated);
19. Quality Control Project Summary, compiled upon project completion;
20. Field notes and records of quantities for progress payments;
21. All survey data required for measurement and payment;
22. As-Built Drawings: Legibly mark on Drawings to record actual construction
   including:
   a. as-built final grade contour information within the limit of disturbance as
data determined within the 0.01 feet;
   b. horizontal and vertical extents of excavation area as determined within
    the 0.01 feet;
   c. horizontal and vertical locations of new and relocated utilities as
data determined within the 0.01 feet;
   d. horizontal and vertical location of all installed sheeting and shoring, left
    in-place, as determined within the 0.01 feet;
   e. field changes of dimension and detail as determined within the 0.01 feet;
   and
   f. details not on original Drawings as determined within the 0.01 feet.

E. Specifications and Addenda shall be legibly marked up to record manufacturer, trade name,
catalog number, and Supplier of each product; changes made by Change or Field Orders, or
other matters not originally specified, shall also be recorded.

1.7 SUBMITTALS

A. At the completion of construction, the Contractor shall deliver one set of project record
documents and one electronic copy of the record documents to the Engineer as a
condition of final payment. Submit project record documents in accordance with Section
01 33 00, and as specified herein.

B. Accompany the project record documents with a transmittal letter containing the following:
1. Date;
2. Project title and number;
3. Contractor's name and address;
4. Title and number of each record;
5. Certification that each document as submitted is complete and accurate; and
6. Signature of the Contractor or his authorized representative.

C. For each set of project record documents, include a directory listing the names, addresses, and telephone numbers of the Contractor, subcontractors, and major equipment suppliers. Also, include operation and maintenance instructions for installed materials and equipment.

1.8 FINAL SURVEY
A. The Owner will perform a topographic and location survey of the limits of work, as shown on the drawings, at the completion of construction.

D. The survey will be provided as electronic files of digital mapping data on CD to Engineer. Data shall be compatible with latest version of AutoCAD computer software.

END OF SECTION
DIVISION 02 - EXISTING CONDITIONS
SECTION 02 32 13
SUBSURFACE DRILLING AND SAMPLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
A. The general provisions of the Contract, including General Conditions, Supplementary Conditions (if any), and General Requirements, apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:
A. Demolition: Section 02 41 00
B. Dewatering: Section 31 23 19
C. Earthwork: Section 31 23 00

1.3 SITE CONDITIONS:
A. Subsurface investigations have been performed at the site by others for the purposes of site investigation during operation of the facility as a hydropower dam. Information from these investigations includes boring logs and test pits logs. The data associated with these investigations are provided as Attachment B. Contractor's reuse of this information without adoption or modification for the particular purposes(s) intended by the Contractor is at its sole risk and without legal liability to the Engineer or Owner.

B. The boring logs and test data include interpretations of subsurface conditions, and opinions of the Engineer and Owner's consultant and are not to be relied upon for the completeness and accuracy thereof for the Contractor's purpose, and shall not be interpreted to prescribe or dictate construction procedures, methods, or techniques or relieve the Contractor in any way of his responsibility for the construction. It is the Contractor's responsibility to interpret between explorations for bid and construction related purposes. The subsurface information is furnished for information only and is not to be considered as forming a portion of the Contract Documents.

C. Water levels shown on the boring logs and test pit logs at the exploration locations are based on observations made by the driller and/or site geologist at the time the explorations were made and may or may not represent the groundwater surface in the immediate vicinity of the exploration.

D. The Contractor is encouraged to familiarize itself with the site and subsurface conditions, and to conduct whatever additional exploration/testing it deems necessary.

1.4 DESCRIPTION OF WORK:
A. The Contractor may, at his discretion, and at no additional cost to the Owner perform additional test borings on the site in order to better define the site subsurface conditions. The extent and locations of additional borings shall be at the Contractor's discretion. The Contractor shall submit the results of additional borings to the Engineer.

B. Work includes furnishing all labor, materials, plant and equipment required to drill soil boring(s), as shown on the Drawings or as determined by the Engineer.

C. The work also includes furnishing all labor, materials, plant and equipment required
to drill concrete boring(s) within the powerhouse, as shown on the Drawings or as
determined by the Engineer.
D. The Contractor shall performed the work in direct coordination with the
Engineer.

1.5 SUBMITTALS:
A. Name of the boring installation subcontractor, including the name and
qualifications of the drilling foreman.
B. The Contractor shall prepare a log of each boring log. The boring log shall include, at a
minimum:
1. boring number.
2. date of drilling.
3. rig type.
4. drilling method.
5. casing and rod size/diameter.
6. sampling type and depth.
7. Standard Penetration Test (SPT) blow counts.
8. soil descriptions and classifications using the Unified Soil Classification
System.
9. casing blow counts.
10. core barrel type and diameter.
11. sample recovery.
12. daily (beginning and end of work shift) water observations in the borehole,
including date and time.
C. The Contractor shall submit to the Engineer the SPT and 3-inch split spoon samples in
tightly capped 12-ounce (minimum), wide-mouth jars packaged in a sturdy cardboard
box. Each jar shall be clearly marked to indicate project, boring number, depth interval,
blow counts (blows per 6 inches), percent recovery, and date sampled.
D. The Contractor shall submit to the Engineer cores of bedrock or concrete in 5-foot
long wooden boxes, with solid spacers between each core run. Each box shall
contain space for four, 5-foot long core runs.
E. The location and elevation of all borings shall be accurately determined and
recorded and shall be provided within 24 hours of completion of installation.

1.6 QUALITY ASSURANCE AND QUALITY CONTROL:
A. The Contractor shall establish and maintain quality control for the work
covered by this Section to assure compliance with contract requirements
and shall maintain records of its quality control for all construction
operations.
B. The Contractor shall retain a competent geotechnical drilling subcontractor,
experienced in the drilling of soil borings and coring to perform the work. The
drilling foreman shall have at least ten years drilling experience.
C. Quality assurance will be provided by the Engineer. The Contractor shall
inform the Engineer at least one week prior to drilling of borings so that the
Engineer can be on site to observe the work. The Contractor shall
coordinate with the Engineer to establish the actual drilling details of each
boring.

D. The components and operational criteria specified herein shall be construed as minimum requirements.

E. The Contractor shall take whatever additional steps it deems necessary to successfully complete the project objectives.

PART 2- PRODUCTS

2.1 GENERAL:

A. Contractor shall supply all products and materials necessary to complete the work as shown on the Drawings, as specified herein or as directed by the Engineer.

PART 3- EXECUTION

3.1 INSTALLATION:

A. Drilling of Soil Borings:

1. Boreholes shall be drilled using 4-inch diameter, flush-joint steel casing using standard wash boring techniques. Casing may be advanced by either driving with a 300-pound hammer and 16-inch drop, or by spinning the casing equipped with a diamond or carbine cutting shoe. Hollow stem augers shall not be used. Boreholes shall be documented with a boring log.

2. Soil samples shall be collected on a minimum of 5-foot interval using SPT sampling methods. On occasion, the Engineer may require that sampling be performed using a 3-inch outside diameter (O.D.), 2-foot long split spoon sampler advanced by a 300 pound hammer and 16-inch drop.

3. Borings shall be drilled to minimum elevation 720 feet, or a minimum depth from the dam crest of 82 feet.

4. Groundwater levels shall be collected in each borehole on a daily basis, and at the termination of drilling.

B. Drilling of Concrete Core Borings:

1. Boreholes shall be drilled in the concrete using an NQ-sized (minimum) diamond-impregnated, double-tube core barrel. The upper slab in powerhouse through the intake slab/apron (approximately elevation 683 feet) shall be cored through, and sand within the powerhouse shall be drilled through using 2.5-inch diameter, flush-joint steel casing (BW casing) using standard wash boring techniques to the top of the powerhouse base slab (elevation 760 feet). Casing through the sand may be advanced by either driving with a 300-pound hammer and 16-inch drop, or by spinning the casing equipped with a diamond or carbine cutting shoe. Hollow stem augers shall not be used.

2. Soil samples of the sand fill shall be collected on a minimum of 5-foot interval using SPT sampling methods. On occasion, the Engineer may require that sampling be performed using a 3-inch O.D., 2-foot long split spoon sampler advanced by a 300 pound hammer and 16-inch drop.

3. The powerhouse base slab shall be thoroughly cored through using a BQ-sized (minimum) diamond-impregnated, double-tube core barrel.
4. Borings shall be drilled to minimum elevation 755 feet.
5. Groundwater levels shall be collected in each borehole on a daily basis, and at the termination of drilling.
6. Boreholes shall be documented with a boring log.

3.2 PROTECTIVE RAILINGS:
   A. Protective railings shall be constructed as necessary for drilling of the concrete core boring. The railing should be spray-painted fluorescent orange.

END OF SECTION
SECTION 02 41 00

DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall furnish all labor, equipment, and materials necessary for the selective demolition, removal, and/or abandonment of some existing structures, as shown on the Drawings and as approved by the Engineer. Work includes, but is not limited to, the following:

1. Protection of facilities, structures, utilities, etc. designated to remain.
2. The partial removal of the Brown Bridge Dam embankment and partial demolition of the powerhouse, training walls, end walls and wing walls, full removal of the abandoned fish ladder, and removal of other minor structures as required to facilitate the Work and as approved by the Engineer.
3. The powerhouse base slab and tailrace apron shall be abandoned in-place and shall not be demolished and removed from the site.
4. Removal and salvage/reclamation of tainter gates, trash rack, generators and turbines, and other salvageable steel.
5. The work consists of partial/localized demolition to remove the protruding sills at the temporary powerhouse opening (upstream face of powerhouse left/south bay) to allow flush connection of sheeting to powerhouse face.
6. Demolition work performed for the convenience of the Contractor will not be considered for payment.
7. Safety measures shall be utilized by the Contractor in the demolition of materials containing lead-based paint, mercury, and/or asbestos containing material.
8. On-site disposal of sand fill from the powerhouse.
9. Off-site disposal of zebra mussels that are attached to gates, track rack, turbines and concrete. Zebra mussels shall be disposed of in accordance with local, State, and Federal requirements.

B. Sampling, analysis, characterization, transportation, and/or disposal of demolished materials are included in and shall be in accordance with Section 02 42 09, “Waste Removal and Handling”.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 11 00: Summary of Work.
B. Section 01 33 00: Submittal Procedures.
C. Section 02 32 13: Subsurface Drilling and Sampling.
D. Section 02 42 09: Waste Removal and Handling.
E. Section 02 42 10: Off-Site Transportation and Disposal.
F. Section 31 23 00: Earthwork.
G. Section 31 23 19: Dewatering
H. Section 31 25 00: Erosion and Sedimentation Controls.

1.3 PROJECT CONDITIONS

A. Site Information:

1. Data provided on powerhouse construction are not intended as representations or warranties of accuracy of the powerhouse construction details. It is expressly understood that neither the Owner, nor the Engineer will be responsible for
interpretations or conclusions drawn there from by Contractor. Data are made available for the convenience and information of the Contractor.

2. One soil boring (minimum) shall be performed from the crest of the dam on the walkway on the upstream side of the powerhouse in the south/left bay to confirm the conditions between the temporary powerhouse openings. Details for performance of this boring(s) are provided in Section 02 32 00.

B. Existing Utilities:
1. The Contractor shall locate in the field existing utilities within and adjacent to the powerhouse in the areas of work. If utilities are to remain in-place, provide adequate means of protection during demolition operations. Cap or fill all abandoned pipes and conduits encountered during construction with grout.

2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with the utility companies in keeping respective services in operation. Contractor shall repair damaged utilities to satisfaction of the utility owner.

C. Use of Explosives:
1. Use of explosives shall not be allowed.

1.4 SUBMITTALS
A. The Contractor shall submit the following items to the Engineer in accordance with Section 01 33 00:
1. Demolition Plan, including means, methods, equipment, and schedule for any demolition work. The Demolition Plan shall include means and methods to demolish the powerhouse and remove demolition debris from the new channel and powerhouse footprint. It shall also include safety measures to demolish materials containing lead-based paint or asbestos.

a. Submit as a component of the Work Plan, as described in Section 01 11 00.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.01 PROTECTION
A. General:
1. Conduct operations to prevent injury to persons.
2. Ensure safe passage of workers/persons around area of demolition.

B. Existing Facilities and Other Works to Remain:
1. Protect throughout the work by temporary fences/barricades and exercise special care to avoid unnecessary damage.
2. Demolition operations shall be conducted such that existing facilities, structures or structural features indicated to remain are not damaged. Existing features or structures that are indicated or made known prior to the start of demolition operations shall be repaired in the event of any damage during such operations.
3. Keep public streets and private roadways accessible to emergency vehicles, patrols, and construction vehicles at all times. Provide street/road cleaning as necessary to prevent hazards.
C. Utility Lines:
1. Decommission all utilities that enter or approach the powerhouse prior to demolition activities.
2. Protect existing utility lines that are indicated to remain from damage.
3. When utility lines to be removed or relocated are encountered, the Contractor shall notify the associated utility company in ample time to minimize interruption of the service.
4. The Contractor shall notify the Engineer immediately of damage to or an encounter with an unknown existing utility line.
5. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of demolition.

3.02 DEMOLITION
A. General:
1. Structures to be demolished or removed shall be discontinued in use prior to start of work.
2. The use of explosives will not be permitted.
3. Depressions, holes, and/or voids resulting from demolition activities shall be backfilled with Subgrade Fill and compacted in accordance with Section 31 23 00.
a. Re-use of demolition debris on-site will not be permitted, unless otherwise specified.

B. Pollution Controls:
1. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level.
2. Comply with governing regulations and the Environmental Protection and Contingency Plan pertaining to environmental protection.
3. Do not use water when it may create hazardous or objectionable conditions such as runoff, ice, flooding, and pollution.
4. Prevent demolition debris from entering the river through the use of engineered controls.

C. Powerhouse:
1. Prior to installation of the temporary dewatering structure (refer to Section 31 23 19), inspect the sill of the temporary powerhouse opening on the upstream face of the left/south bay of the powerhouse by diver or by soundings, and locally demolish the opening sills.
2. Prior to demolition of the powerhouse, completely install temporary dewatering structure.
3. Prior to demolition of the powerhouse, the turbines and generators shall be carefully removed and salvaged.
4. Demolition shall include careful and discrete demolition of a former temporary powerhouse opening on upstream face of the powerhouse in the left/south bay, removal of sand fill between the upstream face of the powerhouse and the powerhouse center wall (left/south bay), removal of a former temporary powerhouse opening/plug (left/south bay). This demolition shall be performed in the dry after the temporary dewatering structure has been installed and the water removed and maintained at a level of elevation 768 feet maximum.
5. Demolition of the powerhouse brick superstructure above elevation 802 feet shall be performed in the dry.
6. Demolition of the powerhouse substructure below elevation 802 feet and above elevation 769 feet shall be performed in the dry and shall be performed as the headpond is lowered.

7. The four tainter gates (two lower and two upper) and the trash racks shall be salvaged during demolition. Salvage any other steel as appropriate.

8. Demolition of the powerhouse below elevation 769 feet and above the existing base mat and tailrace apron (elevation 756 feet to elevation 760 feet) shall be performed in a controlled manner in the wet.

9. The tailrace apron and powerhouse base mat, as well as wing wall foundations and log chute foundations, shall be abandoned in place.

C. Corewall, Abandoned Fish Ladder and other Minor Structures:

1. Completely demolish the former/abandoned concrete fish ladder and dispose of the concrete off-site.

2. The core wall on each side of the powerhouse will require partial demolition within the limits of the excavation for the new river channel. Dispose of core wall debris off-site. Portions of the core wall will be abandoned on-site and buried by regrading the embankment; the top of the abandoned portion of the corewall shall be buried at least 1.5 feet below final grade.

D. Fencing:

1. Where indicated on the Drawings, existing fencing, including fence posts and concrete foundations, shall be completely removed and the steel shall be salvaged.

E. Utility Services:

1. Where indicated on the Drawings or approved by the Engineer, the Contractor shall abandon existing utilities in accordance with the Utility Owner’s requirements.
   a. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

3.03 SAMPLING, ANALYSIS, AND CHARACTERIZATION

A. Demolition debris shall be handled as non-hazardous solid waste, unless otherwise indicated based on visual examination.

B. If necessary based on visual examination, sampling, analysis, and characterization shall be as specified in Section 02 42 09.

3.04 TRANSPORTATION AND DISPOSAL

A. Transportation and/or disposal are included in and shall be in accordance with Section 02 42 10.

END OF SECTION
SECTION 02 42 09

WASTE REMOVAL AND HANDLING

PART I  GENERAL

1.1  SUMMARY
A. This Section includes a description of responsibilities for proper transportation and disposal of waste materials including, but not limited to, clearing and grubbing debris, demolition debris (concrete, brick, timber piles or cribbing, miscellaneous metal, wood, and other demolition debris, etc.); ancillary waste (disposable personal protection equipment (PPE), plastic sheeting and sampling equipment); and site trash.
B. Clearing and grubbing materials and debris from the embankment dam shall be used for covering of Spoils Areas #6 and #7 near the dam.
C. The Contractor shall be responsible for general excavation/removal, handling, and storage of waste materials.

1.2  RELATED WORK SPECIFIED ELSEWHERE
A. Section 01 11 00: Summary of Work.
B. Section 01 57 20: Temporary Dust and Odor Control.
C. Section 02 41 00: Demolition.

1.3  SUBMITTALS
A. A Work Plan shall be submitted prior to start of the Work as referenced in Sections 01 11 00 and 02 41 00. The Contractor shall include as a component of the Work Plan, the planned means and methods for management of all waste materials removed or generated as a component of the Work.
B. The Contractor shall submit to the Engineer the results of all laboratory testing of lead-based paint, mercury or asbestos-based wastes, and provide location and estimate of material that contain those material.

1.4  WASTE CONTAINERS
A. Waste containers shall be provided as follows:
1. The Contractor shall provide appropriate legal containers and/or trucks for the management and off-site disposal/recycling of, non-contaminated demolition debris, all other non-contaminated debris removed during site preparation.
2. Contractor shall provide plastic bags for disposable PPE. Plastic bags shall have a minimum thickness of six (6) mils.
3. Contractor shall provide portable, temporary storage tanks (Frac tanks, Baker tanks, etc.) for the storage of collected liquids at the decontamination pad (i.e. decontamination fluids) that contains oil, grease, fuel, or other petroleum products. The Contractor is responsible for the rental of the tanks or similar containers and cleaning and demobilization of tanks at the end of the project. The Contractor shall identify the specific type and number of portable containers/tanks that are required.
4. Containers (e.g., roll-off containers) for non-hazardous municipal trash and debris. Roll-off containers shall be provided by Contractor and utilized for storage of wastes generated during the site preparation activities, construction
activities, and waste materials from site cleanup activities. The Contractor shall identify the specific type and number of roll-off containers that are required.

5. Michigan Department of Transportation (MDOT)-approved, steel drums (55-gallon capacity) with lids for possible storage of residual contaminated materials or materials with high waste liquid content shall be provided by the Contractor.

B. Transporter hired by Contractor shall provide trucks and equipment required for loading lead based paint, mercury or asbestos contaminated demolition debris.

C. Container Identification. Trucks or containers shall be labeled with MDOT approved placards based on the type of waste and associated risk.

1.5 ON-SITE MANAGEMENT AND STORAGE OF MATERIALS

A. The Contractor shall be responsible for proper on-site management of wastes generated in compliance with all Federal, State and local regulations. Management shall include handling, segregating, processing (as required), and storing all wastes generated during the Contractor’s Work.

B. Contractor shall control dust generation during waste handling, as specified in Section 01 57 20.

C. The Contractor shall segregate contaminated from non-contaminated demolition materials. Contaminated materials shall be segregated into hazardous and non-hazardous materials as required for proper off-site disposal.

D. On-site material processing may be required to prepare the material for off-site transportation and disposal. Processing shall occur in consultation with the Engineer to establish a solid waste with minimal volume and weight to reduce disposal costs. Processing may include:

1. Dewatering waste material to remove excess water. Dewatering shall include constructing sumps in stockpile containment areas to collect drained water and turning soil to expose to air to facilitate drying.

2. Bulking the waste material with added soils or agents to solidify and stabilize material. Bulking options could include the addition of proportions of lime, kiln dust, ash, or other drier soil of same waste character. All bulking proposals by the Contractor shall be reviewed and approved by the Engineer prior to implementation.

E. Contaminated waste soil is not anticipated to exist on site. If encountered or if construction operations induce contamination (e.g., hydraulic fluid contamination from possible ruptured hydraulic lines), it shall be segregated for off-site disposal shall be approved by the Engineer for off-site disposal.

F. The Contractor shall be responsible for coordinating the movement of the containers, trucks, etc. into positions required for proper loading and management of material generated during Work.

G. The Contractor shall be responsible for loading waste containers, trucks, etc. with excavated soil and removed material/debris generated.

H. The Contractor shall limit the quantity and duration of on-site stockpiling of waste materials to the extent practical.

I. The Contractor shall not load waste containers, trucks, etc. with non-contaminated materials prior to determination that the decontamination of the waste container/truck has been achieved.

J. The Contractor shall be responsible for coordinating the schedule for delivery and pick-up of supplied waste containers. The Contractor shall also be responsible for movement and storage of containers within the site to allow the progress of the Work.
K. The Contractor shall install stockpile containment areas for contaminated material storage associated with Work, as appropriate. Line and berm contaminated material stockpile areas with plastic sheeting to contain dewatering fluids and capture contaminated storm water runoff. Cover stockpiles with plastic sheeting to prevent erosion of the stockpiles and limit contact with precipitation. The plastic sheeting shall be weighted down, as required, with ropes, sandbags, and tires, or other similar means.

1.6 SAMPLING AND TESTING OF WASTES

A. All waste characterization for demolition debris shall be completed by the Contractor.
   1. If contaminated material is encountered, the Contractor shall collect samples and coordinate testing to adequately characterize each waste type and quantity.
      a. Laboratory testing of wastes shall be performed by a laboratory certified by the Michigan Department of Environmental Quality (MDEQ).
      b. All laboratory test methods and frequencies shall be in accordance with MDEQ requirements.
      c. Laboratory reports shall be prepared by the subcontracted laboratory to include all requirements of the State.
   2. The Contractor shall collect test samples in the following manner:
      a. The Contractor shall supply equipment and personnel to collect waste samples.
      b. The Contractor shall at its discretion move waste stockpiles and segregate material, and/or prepare samples, including breaking large waste debris into sample-sized portions.

B. Sampling and testing shall not be required for clearing and grubbing debris or general site trash.

C. Sampling and testing of demolition debris shall be completed by the Contractor at their discretion based the following conditions:
   1. Possible existence of contaminated material.
   2. Location of the removed material.
   3. Observation of in situ contact of the removed material with free product such as oil, hydraulic fluid or other similar contamination.
   4. Indications of in situ contact with contaminated material as noted by olfactory or visual screening.

D. Sampling and moisture content testing of contaminated soil shall be completed by the Contractor at their discretion if material looks excessively wet or appears to be free draining.

E. Sampling and testing of liquid waste (i.e. decontamination fluids, construction dewatering, and contaminated storm water) shall be completed by the Contractor using the required methods and at the required frequency of the Treatment, Storage and Disposal Facility if it is suspected to contain oil, grease, fuel or other petroleum products.

PART 2 PRODUCTS

Not Applicable
PART 3 EXECUTION

Not Applicable

END OF SECTION
SECTION 02 42 10
OFF-SITE TRANSPORTATION AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY
   A. The Contractor is responsible for the off-site transportation and disposal of all waste materials generated during the Work. This Section includes a description of responsibilities for proper transportation and disposal of waste materials including, but not limited to, clearing and grubbing debris, demolition debris (reinforced concrete, brick, timber piles or cribbing, miscellaneous metal, wood, and other demolition debris, etc.); ancillary waste (disposable personal protection equipment (PPE), plastic sheeting and sampling equipment); and site trash.

1.2 RELATED WORK SPECIFIED ELSEWHERE
   A. Section 01 11 00: Summary of Work.
   B. Section 02 41 00: Demolition.
   C. Section 02 42 09: Waste Removal and Handling.

1.3 SUBMITTALS
   A. The Contractor shall prepare and implement a Work Plan that describes planned means and methods for transporting and disposing of all waste materials removed or generated as a component of the Work. Refer to Sections 01 11 00 and 02 41 00.
   B. Bill of Lading and Manifests for all transported waste loads.
   C. Certified weight slips for each load transported to the Treatment, Storage, and Disposal Facility.

1.4 WASTE CONTAINERS
   A. The Contractor shall provide waste containers specific to the individual waste as described in Section 02 42 09.
   B. Container Identification. Transporters shall provide trucks or containers labeled with Michigan Department of Transportation-approved placards based on the type of waste and associated risk.

1.5 TRANSPORTATION OF WASTES
   A. The Contractor shall be responsible for the following:
      1. Transportation of all non-contaminated wastes specified or generated as a result of the Work. This includes clearing and grubbing debris, non-contaminated demolition debris, and general site trash.
      2. Transportation of all contaminated solid waste as specified or generated as a result of the Work. This includes construction and demolition debris and non-hazardous soil.
      3. Transportation of all contaminated liquid wastes as specified or generated as a result of the Work. This includes non-hazardous, RCRA-hazardous, TSCA-hazardous, and/or TSCA/RCRA-hazardous liquid wastes.
1.6 TRANSPORTATION COORDINATION
A. The Contractor shall be responsible for coordinating the number and schedule of vehicles required for off-site transportation of waste materials generated during the execution of the specified Work. Coordination shall occur with the Contractor, Contractor’s Transporter and the disposal facility. The schedule of trucks shall consider the following:
1. Direct load waste material, when possible to minimize on-site stockpiling.
2. Work within any permitted traffic constraints imposed by the City or other regulating authority.
B. The Contractor shall inspect the transportation vehicles before and after loading to ensure compliance with all local, State, and Federal regulations for the safe transport of wastes from the site to the receiving facility.
   1. All trucks transporting contaminated material shall be lined with plastic prior to filling.
   2. All trucks shall be covered prior to departure.
   3. All loaded trucks shall pass through the decontamination pad prior to exiting the Site.
C. The Contractor shall insure that the trucks arriving at the Site for loading do not cause undue congestion to local streets and shall stage trucks either within the perimeter of the site or at an off-site staging area approved by the Engineer. Transporters shall not be accepted at the site before 7:00 AM and after 5:00PM.
D. The Contractor's Transporters shall proceed directly from the site to the designated receiving facility. Temporary staging or storage of material at intermediate locations between the Site and the receiving facility is prohibited.
E. Transporters shall proceed from the site along traffic routes established by the Contractor and approved by the local municipality. Transporters shall call back weights after each load and modify loads accordingly. The Contractor shall ensure that trucks leaving the site are within appropriate weight limitations for the local roads along the designated route.

1.7 DISPOSAL OF WASTES
A. The Contractor shall be responsible for the proper disposal of all non-contaminated demolition wastes including clearing debris and site trash specified or generated as a result of the Work at the Site. Proper disposal requires that the facility accepting the waste be a State licensed Treatment, Storage, and Disposal Facility (TSDF) that is approved for acceptance of the waste based on classification of the material.
B. The disposal facilities shall be approved by the Owner prior to the transporting of waste. The Contractor shall not change facilities without prior consent of Owner.
C. Contractor shall be responsible for the proper disposal of all contaminated wastes (liquid and solid) specified or generated as a result of the Work at the Site. Disposal shall occur at a pre-designated treatment, storage, and/or TSDF approved by the Owner. The TSDF accepting the waste will be a state licensed TSDF that is approved for acceptance of the waste based on classification of the material and/or the results of the characterization testing and analysis.
   d. Decontamination water to remove invasive species from equipment shall be disposed of on-site at a location approved by the Owner if determined to contain no petroleum-based contaminants.
   e. Decontamination water to remove invasive species from equipment that includes oil, grease, fuel, or other petroleum-based contaminants shall be containerized and disposed of off-site in accordance with local, State, and Federal requirements.
1.8 RECORD KEEPING
   A. The Contractor shall originate and maintain a copy of each executed Bill of Lading for all loads shipped off-site by their Transporter.
      1. The Contractor shall sign all waste manifests as the generator.
      2. The chain of custody of all waste manifests shall occur in compliance with 40 CFR Part 261.
   B. The Contractor shall maintain documentation and records verifying receipt of each of their Transporter’s truck loads by the receiving facility. Such documentation shall indicate the actual weight of each load shipped utilizing a calibrated/certified truck scale as specified in subsection 2.2 of this Section.

PART 2 PRODUCTS

2.1 TRUCK INSPECTION ACCESS
   A. Contractor shall provide a means for regulatory agency representatives and others to visually inspect truck beds prior to and after loading.
   B. Access shall provide a safe, stable means to complete required inspections and shall comply with all applicable OSHA regulations.

2.2 TRUCK SCALE
   A. Contractor shall utilize a calibrated/certified scale to weigh loaded trucks transporting wastes off-site for disposal. Scale may be, at a minimum, a load cell of sufficient dimension and capacity to record weights per vehicle axle. The load cell shall be suitable for exterior installation with the necessary support/protective structure.
   B. Scale shall be connected to a digital recording or print device that can store or print weights measured throughout the work day.

PART 3 EXECUTION

Not Applicable

END OF SECTION
SECTION 02 82 00

REMOVAL AND DISPOSAL OF ASBESTOS

PART 1  GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE
A. Summary of Work:  Section 01 11 00
B. Demolition:  Section 02 41 00

1.2 DESCRIPTION
A. Work includes the following:
   1. Sampling, analysis, and removal of all asbestos containing materials (ACM) from the facility.
   2. Disposal of all ACM at a licensed disposal facility.

1.3 REFERENCES
A. The following specifications and standards of the issues listed below form a part of this specification to the extent required by the references thereto:
      29 CFR 1926.58  Asbestos (latest version)
      29 CFR 1910.134  Respiratory Protection
      29 CFR 1910.145  Specifications for Accident Prevention Signs and Tags
      40 CFR 61  General Provisions, Subpart A
      40 CFR 61  National Emission Standard for Asbestos, Subpart M
      40 CFR 763  Asbestos Abatement Projects, Subpart G
      49 CFR 171  General Information
      49 CFR 172  Hazardous Materials
      49 CFR 173  General Shipping Requirements
      49 CFR 177  Transporter Requirements
      49 CFR 178-79  Container Specifications
   2. American National Standard Institute (ANSI) Publication:
      29.2-79  Fundamentals Governing the Design and Operation of Local Exhaust Systems
   3. U.S. Environmental Protection Agency (USEPA) Publication:
      EPA 560/5-85-024  Guidance for Controlling Asbestos Containing Materials in Buildings
   4. State of Michigan Regulations:
      R299.41312  Federal Asbestos Regulations; Adoption by Rule  R325 Asbestos Contractor Licensing

1.4 QUALITY CONTROL
A. Medical Requirements:  Meet all medical requirements contained in 29 CFR 1926.58 including but not limited to medical exams and medical records.
B. Training
   1. Ensure that all personnel exposed to airborne asbestos are familiar with the hazards of asbestos, safety and health precautions, and the use and requirements for protective clothing and equipment.
   2. A "competent person" shall directly supervise all asbestos removal activities including but not limited to establishment of enclosures, ensuring enclosure integrity, controlling entry and exit from the enclosure, exposure monitoring, use of
protective clothing and equipment, use of hygiene facilities, and use of engineering emission controls. The "competent person" shall meet all the requirements identified in 29 CFR 1926.58(b) and 29 CFR 1926.58(e)(6)(iii).

C. Permits and Notification
1. Secure necessary permits in conjunction with ACM removal, hauling, and disposition and provide timely notification of such actions as may be required by federal, state, regional, and local authorities.
2. Notify the Michigan Occupational Safety and Health Administration (MIOSHA)/Michigan Department of Licensing and Regulatory Affairs, 10 days prior to commencement of the work.
3. Notify AMEC 10 days prior to the start of asbestos work.
4. Notify the Michigan Department of Environmental Quality at least 10 days prior to commencement of work.

D. Safety Compliance
1. Comply with laws, ordinances, rules, and regulations of Federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials.
2. Comply with the applicable requirements of the current issue of 29 CFR 1926.58 and 40 CFR 61, Subparts A and M.
3. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work.
4. Where the requirements of this specification and reference documents vary, the most stringent requirements shall apply.


1.05 SUBMITTALS
A. Submit the following in accordance with Section 01340, "Submittals".
1. Certificates of Compliance: Submit manufacturers' certification that vacuum pumps, ventilation equipment, and other equipment required to handle airborne asbestos fibers conform to ANSI 29.2.
2. Asbestos Contractor License: Submit a copy of a valid/current license for the asbestos abatement activities as required by the Michigan Department of Consumer and Industry Services.
3. Asbestos Plan: Submit as specified in Section 01125, "Special Project Procedures," the abatement procedures to be used in the removal and disposal of ACM. Such plan shall conform to this section and the USEPA requirements of 40 CFR 61.22.
4. The Contractor shall submit a list of ACM disposal facilities proposed for the disposal of all ACMs associated with this Contract. The list shall contain the address, telephone number and contact name for each facility. The Contractor shall provide written approval from each disposal facility of its acceptance of ACMs from this Contract and written notice from each asbestos disposal facility that it is in conformance with its operating permit.
5. Testing Laboratory: Submit the name, address, and telephone number of the testing laboratory selected for the monitoring of airborne concentrations of asbestos fibers along with certification that persons counting the samples have been judged proficient. Sampling is required under 29 CFR 1926.58. Monitoring shall be conducted daily to establish the exposure of each employee who is exposed inside the work area. The laboratory reading the tests shall be a participant of an approved and recognized Performance and Testing (PAT) program.
6. Monitoring Results: Submit all monitoring results to AMEC within 14 working days of such monitoring.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 EQUIPMENT
A. Provide protective equipment as required by 29 CFR 1926.58.

3.02 WORK PROCEDURE
A. The Contractor is responsible for complying with all laws, ordinances, rules and regulations of Federal, state, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials.

B. Provide asbestos control areas with caution signs and local exhaust as may be directed by AMEC in accordance with these specifications and 29 CFR 1926.58, 40 CFR 61, Subparts A and B. Use wet removal procedures. Personnel shall wear and use protective clothing and equipment as required by 29 CFR 1926.58. Eating, smoking, or drinking shall not be permitted in the asbestos control area. Personnel of other trades not engaged in the removal and demolition of asbestos shall not be exposed at any time to airborne concentrations of asbestos unless trade personnel comply with all the personnel protection provisions of this specification.

C. During demolition activities in areas of ordered demolition:
1. The entire structure to be demolished shall be adequately wet.
2. The demolition debris shall be maintained adequately wet at all times after demolition and kept wet during handling and loading for transport to the approved disposal facility.
3. Transport of RACM shall be in lined trucks.

3.03 ASBESTOS ABATEMENT PROCEDURES
A. General Procedures
1. Sufficiently wet asbestos material during removal, cutting, or other handling so as to reduce the emission of airborne fibers. Asbestos-containing debris shall be kept wet at all times. Method and techniques for removal are outlined in the appendices to 29 CFR 1926.58.

2. Remove materials and immediately place in plastic disposal bags. Where unusual circumstances prohibit the use of plastic bags, submit an alternate proposal for containment of asbestos fibers to AMEC for approval.

3. The Contractor may use the following abatement procedures depending on the type of ACM and the Contractor’s standard procedures. Alternate abatement procedures shall be detailed in the Contractor’s Work Plan.
Full Containment

1. Where deemed appropriate for friable ACM removal, full containment shall be used. The Contractor shall isolate the work area for the duration of the abatement, completely sealing all openings. Any fixed objects will be covered with 6-mil polyethylene sheets taped securely in place. All polyethylene used for establishing containment areas shall be a fire retarding type.

2. The entire floor within the immediate, contained work area will be covered with two layers of 6-mil polyethylene extended up the vertical surfaces. On a daily basis, an additional 6-mil polyethylene liner will be placed below the planned work area.

3. Emergency exits shall be clearly marked by the Contractor’s personnel and access will be maintained throughout the abatement activities. Fire extinguishers will be located in each work area.

4. The Contractor shall install and maintain negative pressure equipment during the abatement and decontamination process. A sufficient number of negative air machines will be installed to ensure a complete air change within the containment every 15 minutes.

5. Attached to each full containment will be a three-chambered decontamination facility. The Contractor’s three-chambered decontamination will consist of:
   a. An equipment room with an air lock to the work area and curtained doorway to the shower room.
   b. A shower room with two curtained doorways, one to the equipment room and one to the clean room. The shower room will contain sufficient showers with hot and cold water to support the planned crew during each work shift. The Contractor will contain and filter all shower waste water. Wastewater will be filtered through a 5.0 micron filter, and drained into a sanitary sewer upon approval of the City of Kalamazoo.
   c. A clean room with one curtained doorway/entrance and one curtained doorway into the shower room.

Glovebag Method

1. Where feasible, the Contractor shall isolate working areas by constructing a single layer of 6-mil polyethylene to act as an isolation barrier (mini-containment).

2. The Contractor shall isolate the work area for the duration of the abatement, completely sealing all openings. The entire floor within the immediate work area will be covered with two layers of 6-mil polyethylene. Any fixed objects will be covered with 6-mil polyethylene taped securely in place.

3. Emergency exits will be clearly marked by the Contractor personnel and access will be maintained throughout the abatement activities. Fire extinguishers will be located at each work area.

4. The Contractor shall install and maintain negative pressure equipment during the abatement and decontamination process. A sufficient number of negative air machines will be installed to ensure a complete air change within the containment four (4) times per hour.

5. Attached to each mini-containment will be a two-chambered decontamination facility. The Contractor’s two-chambered decontamination shall consist of:
   a. An equipment room with a curtained doorway to the isolated work area and curtained doorway to the shower room.
   b. A shower room with two curtained doorways, one to the equipment room and one to the clean room. The shower room will contain at least one shower with hot and cold water. The Contractor will contain and filter
all shower waste water. Waste water will be filtered through a 5.0 micron filter, and drained into a sanitary sewer upon approval of the City of Kalamazoo.

6. The Contractor may elect to use a three-stage decontamination facility as described earlier in place of the two-stage facility as a remote decontamination facility. If a remote decontamination facility is used, all personnel will be required to double-suit.

7. All abatement utilizing the glovebag method will be conducted so that the glovebag completely surrounds the object to be abated and contains all asbestos fibers released during the removal process. The glovebags will have tools and equipment to allow the Contractor to wet-down the ACM, and to maintain filtered negative-pressure on the glovebag internals. Following cutting of the insulation inside the bag, excess air will be removed by filtered vacuum, the glovebag will be removed and sealed and placed in secondary containment for disposal.

8. All of the Contractor’s workers who utilize this method of removal must be highly trained, experienced and skilled in this method.

D. Wrap and Cut Method

1. This method of removal may be utilized when removing asbestos pipe insulation that is not damaged (note: No undamaged asbestos insulation was encountered during the pre-demolition asbestos survey). Workers donning protective coveralls and 1/2 faced respirators (PAPRs if appropriate) will cordon off the work area and post proper signs at the perimeter. The asbestos insulation will then be wrapped-in-place with two layers of 6-mil polyethylene. All seals will be spray glued and duct taped.

2. Once the insulation is wrapped, glovebags shall be attached to the pipe. The glovebag abatement shall be done every ten to twenty (10-20) feet to allow the cutting of the pipes into manageable sections. Pipe and equipment prepared in this manner shall be transported to a decontamination area for gross removal and salvage. Alternately, wrapped equipment and piping may be sent directly to disposal if removal is not economical.

3. If pipe cut locations are not insulated, the use of glove bags will not be required at those locations.

4. A remote two-stage (or three-stage, if desired) decontamination facility shall be used for personnel decontamination.

E. Roofing Materials

1. For removing the roofing material that contains ACM, Contractor shall ensure that the following work practices are followed:
   a. Roofing material shall be removed in an intact state to the extent possible.
   b. Wet methods shall be used to remove roofing materials that are friable, or that will be rendered friable during removal, unless such methods are not feasible or will create safety hazards.
   c. Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.
   d. When removing built-up roofs with asbestos containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation shall be collected with a HEPA-filtered dust collector, or shall be HEPA vacuumed by vacuuming along the cut line.
   e. When removing built up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the
cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line.

2. Asbestos-containing material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist:
   a. Any ACM that is not intact shall be lowered to the ground as soon as possible, but in any event no later than the end of the work shift. While the materials remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.
   b. Intact ACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.
   c. Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.
   d. Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.

F. Wiring Insulation

1. Wiring insulation is assumed to be friable and the removal method has the potential to release asbestos fibers to the atmosphere. If the wiring insulation does not appear to be friable upon removal, it should be handled accordingly.

2. The Contractor shall follow Full Containment method for the abatement of ACM containing window glazing, unless otherwise directed by the AMEC.

3. Isolate working areas by constructing critical barriers of 6-mil polyethylene. All openings such as ducts, electrical outlets, and windows will be sealed. Any fixed objects shall be covered with 6-mil polyethylene taped securely in place.

4. Emergency exits shall be clearly marked by Contractor personnel and access will be maintained throughout the abatement activities. Fire extinguisher shall be located at each work area.

5. A remote two- or three-stage personnel decontamination facility may be utilized, or a decontamination facility attached to the work area.

3.04 MONITORING

A. Monitoring of airborne concentrations of asbestos fibers shall be in accordance with 29 CFR 1926.

B. Pre-removal Monitoring: Provide area monitoring inside prior to beginning work to establish ambient plant air quality.

C. Monitoring following Final Cleanup: Provide asbestos control area monitoring of asbestos fibers and establish the Time Weighted Average (TWA) of less than 0.01 fibers/cc after final clean-up but before removal of the enclosure of the asbestos control area. Monitoring shall use aggressive sampling techniques as described in the "Guidance for Controlling Asbestos-Containing Materials in Buildings" EPA 560/5-85-024, Appendix M. Sampling shall be by the phase contrast microscopy (PCM) method. A minimum of five samples shall be taken for each asbestos control area. The sampling volume for each sample is to be approximately 3000 liters. Provide area monitoring and establish the TWA 5 days after the enclosure of the asbestos control area is removed or after final clean-up when an enclosure is not required. The fiber counts from these samples shall be less than 0.01 fibers/cc. Should any of the final samples indicate a higher value, take appropriate actions to re clean the area and repeat the monitoring.
3.05 CLEANUP
A. General
1. Remove all asbestos debris.
2. The Contractor shall take any steps necessary to ensure that less than 0.01 fibers/cc airborne asbestos remains in the work area.

B. Housekeeping
1. Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos work area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Do not blow down the space with compressed air.
2. When asbestos removal is complete, all asbestos debris is removed from the site, and final clean-up is completed, certify the area as safe before the signs are removed. Certification shall be a written statement by the Contractor that airborne concentrations of asbestos are less than 0.01 fibers/cc and all asbestos material has been removed from the area. Dispose of filters as asbestos contaminated materials.

3.06 DISPOSAL
A. The Contractor shall be responsible for ensuring:
1. Selection and acceptance of the ACM at an approved treatment or disposal facility.
2. That the facility is properly permitted to accept the ACM.
3. That the facility provides the stated disposal services.
4. That the disposal facility is in compliance with its permit(s) at the time of ACM disposal.

B. Collect asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed impermeable bags. Affix caution label to each bag.

C. Procedure for hauling shall comply with 40 CFR 61 (Subpart B), state, regional, and local standards. ACM shall be transported in lined trucks.

D. Dispose of asbestos materials and asbestos contaminated materials at a licensed disposal facility.

3.07 MANIFEST RECORDS
A. Originate, maintain, and provide Transporter with copies of waste shipment manifests and/or bills of lading records for all ACM; verify wastes and quantities of each load shipped.

B. The manifest forms and records shall be consistent with the State of Michigan, USEPA, and U.S. Department of Transportation requirements.

END OF SECTION
DIVISION 05 - METALS
PART 1 - GENERAL

1.01 RELATED DOCUMENTS:
A. The general provisions of the Contract, including General Conditions, Supplementary Conditions (if any), and General Requirements, apply to the work specified in this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE:
A. Metal Fabrications: Section 05 50 00
B. Earthwork: Section 31 23 00
C. Dewatering: Section 31 23 19
D. Excavation Support and Protection: Section 31 50 00

1.03 DESCRIPTION OF WORK:
A. Furnish all labor, equipment, and materials and completely install structural steel work as described in this section, shown on the Drawings, or as directed by the Engineer, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.
B. Structural steel is that work defined in the AISC "Code of Standard Practice" and as otherwise shown on the Drawings.
C. Structural steel to be provided by an Owner-approved fabricator.

1.04 QUALITY ASSURANCE AND QUALITY CONTROL:
A. Codes and Standards: Comply with the provisions of the following codes, standards, and specifications, except as otherwise shown or specified:
   1. American Institute of Steel Construction (AISC):
      b. AISC "Specification for Structural Steel for Buildings" – most recent version.
      c. AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts” - most recent version approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
B. Qualification for Welding Work:
   1. Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure."
   2. Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months.
3. If recertification of welders is required, retesting shall be the Contractor's responsibility.

C. The Contractor will engage an independent testing and inspection agency for quality control (QC) by a certified welding inspector (CWI). The agency will inspect shop and field connections and perform tests and prepare test reports. The name of the testing agency shall be submitted to the Engineer for approval. Connections will be inspected by the testing agency for conformance to the Drawings and AISC Specifications. Welded connections will be inspected by the testing agency in conformance with AWS D1.1. All structural shop and field welds will be 100 percent visually inspected and 100 percent radiographic inspection (dye penetrant at fillet welds) shall be performed on connections noted on drawings.

D. The Contractor's testing agency will conduct and interpret the tests and state in each report whether the test specimens comply with the requirements, and specifically state any deviations there from.

E. The Contractor's testing agency shall inspect structural steel at the plant before shipment; however, the Engineer reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.

F. The Contractor shall correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. The testing agency shall perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of the original work, and as may be necessary to show compliance of corrected work.

G. The Owner will engage a testing and inspection agency to assist the Engineer with quality assurance (QA). Testing and inspection by the Engineer does not relieve the Contractor of any responsibility for quality control.

H. It is not the intent of this Specification to define the exact requirements for QA. The Owner and the Engineer will design, establish, and implement this program.

I. The steel fabricator shall provide access for the Engineer and his testing agency to places where structural steel work is to be fabricated or produced so that required inspection and testing can be accomplished.

1.05 SUBMITTALS:
A. Shop Drawings:
   1. Submit shop drawings, sealed by a registered professional engineer, including complete details and schedules for fabrication and assembly of structural steel members and procedures and diagrams.
   2. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.
   3. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.
   4. Provide steel manufacturer’s Certified Test Reports to the Engineer for all structural steel.

1.06 DELIVERY, STORAGE, AND HANDLING:
A. Deliver materials to the site at such intervals to insure uninterrupted progress of the work.
B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that work.
C. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using blocking, pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

D. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 MATERIALS:
A. Rolled Steel Plates, Shapes and Bars: ASTM A36, except where other type steel is shown or specified.
B. Steel Pipe: ASTM A53, Type E or S, Grade B.
D. Anchor Bolts: ASTM A307, unless otherwise indicated.
E. Headed Stud Type Shear Connectors: ASTM A108, Grade 1015 or 1020, cold finished carbon steel; with dimensions complying with AISC Specifications, and as shown on the Drawings.
F. Unfinished Threaded Fasteners:
   1. ASTM A307, Grade regular low-carbon steel bolts and nuts.
   2. Provide hexagonal heads and nuts for all connections.
G. High-Strength Threaded Fasteners: Heavy hexagonal structural bolts, heavy hexagon nuts, and hardened washers, conforming to ASTM A325 except where otherwise shown or specified.
H. Electrodes for Welding: Comply with AWS Code using E70 electrodes unless otherwise noted.

2.02 DETAILING AND CONNECTIONS:
A. Design and detail structural connections to resist shears, moments and axial loads shown on the Drawings or as further specified herein. Promptly notify the Engineer whenever the design of connections for any portion of the structure is not clearly indicated.
B. Unless otherwise shown or specified, end connections for beams and girders shall be Type 2 construction (AISC). Where specific loads or reactions are not shown on the Drawings for beams and girders, connections shall be designed for one-half the total uniform load capacity of the member as tabulated in the AISC Manual, Part 2.
C. One-sided or eccentric beam connections shall not be used unless approved in advance by the Engineer.

2.03 FABRICATION:
A. Shop Fabrication and Assembly:
   1. Fabricate and assemble structural assemblies in the shop to the greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on the final shop drawings.
   2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
   3. Where finishing is required, complete the assembly, including welding of
units, before start of finishing operations. Provide finish surfaces of members exposed in the final structure free of markings, burrs, and other defects.

B. Connections:
1. Weld or bolt shop connections, as indicated.
2. Provide high-strength threaded fasteners for all principal bolted connections, except where unfinished bolts are shown.

C. Welded Construction:
1. Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
2. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

D. Shear Connectors: Prepare steel surfaces as recommended by the manufacturer of the shear connectors. Field weld shear connectors, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with the manufacturer's printed instructions.

PART 3- EXECUTION

3.01 INSPECTION:
A. General:
1. Erector shall examine the areas and conditions under which structural steel work is to be installed, and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work.
2. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Erector.

3.02 ERECTION:
A. General: Comply with the AISC Specifications and Code of Standard Practice, and as herein specified.
B. Surveys:
1. Employ a registered land surveyor or professional engineer, experienced in survey work, to establish permanent bench marks as shown and as necessary for the accurate erection of structural steel.
2. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to the Engineer.
3. Do not proceed with erection until corrections have been made, or until compensating adjustments to the structural steel work have been agreed upon with the Engineer.

C. Temporary Shoring and Bracing:
1. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
2. Remove temporary members and connections when permanent members are in place and final connections are made.
3. Provide temporary guy lines to achieve proper alignment of the structures as erection proceeds.

D. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete the work.
E. Anchor Bolts:
1. Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
2. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

F. Setting Bearing Plates:
2. Set loose and attached base plates and bearing plates for structural members on metal wedges or other adjusting devices.
3. Tighten the anchor bolts after the supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the base or bearing plate.

G. Field Assembly:
1. Set structural frames accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevation and alignment.
2. Level and plumb individual members of the structure within specified AISC tolerances.
3. Establish required leveling and plumbing measurements on the mean operating temperature of the structure. Make allowances for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
4. Splice members only where shown or specified.

H. Erection Bolts:
1. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
2. Comply with AISC Specifications for bearings, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to field welds.
3. Do not enlarge unfair holes in members by burning or by the use of drift pins. Ream holes that must be enlarged to admit bolts.

I. Gas Cutting:
1. Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing. Cutting will be permitted only on secondary members who are not under stress, as acceptable to the Engineer.
2. Finish gas-cut sections equal to a sheared appearance when permitted.

J. Shear Connectors: Weld shear connectors to beams and girders as indicated on the framing plans. Welding shall be performed in strict accordance with AWS D1.1.

END OF SECTION
SECTION 05 50 00

METAL FABRICATIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:
   A. The general provisions of the Contract, including General Conditions, Supplementary Conditions (if any), and General Requirements, apply to the work specified in this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE:
   A. Structural Steel: Section 05 12 00

1.03 DESCRIPTION OF WORK:
   A. Furnish all labor, equipment, and materials and completely install metal fabrications work as specified in this section, shown on the Drawings, or as directed by the Engineer. The work includes items fabricated from iron, steel, and aluminum shapes, plates, bars, strips, tubes, pipes and castings, which are not a part of structural steel or other metal systems in other sections of these specifications.

1.04 QUALITY ASSURANCE AND CONTROL:
   A. Codes and Standards: Comply with the provisions of the following codes, standards, and specifications, except as otherwise shown or specified:
   B. Qualification for Welding Work:
      1. Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure."
      2. Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months.
      3. If recertification of welders is required, retesting shall be the Contractor's responsibility.
   C. Source Quality Control:
      1. Materials and fabrication procedures are subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests shall not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
      2. Promptly remove and replace materials or fabricated components which do not comply.
   D. The Contractor will engage an independent testing and inspection agency to inspect shop connections and to perform tests and prepare test reports. Connections will be inspected by the testing agency for conformance to the Drawings and AISC Specifications. Welded connections will be inspected by the testing agency in conformance with AWS D1.1. All structural shop welds will be 100 percent visually inspected and 100 percent radiographic inspection shall be performed on connections noted on drawings.
E. The testing agency will conduct and interpret the tests and state in each report whether the test specimens comply with the requirements, and specifically state any deviations there from.

F. The steel fabricator shall provide access for the testing agency and Engineer to places where structural steel work is to be fabricated or produced so that required inspection and testing can be accomplished.

G. The testing agency shall inspect structural steel at the plant before shipment; however, the Engineer reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.

H. The Contractor shall correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. The testing agency shall perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of the original work, and as may be necessary to show compliance of corrected work.

1.05 SUBMITTALS:

A. Manufacturer's Data:
   1. For information only, submit two copies of manufacturer's specifications, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products.
   2. Indicate by transmittal that copy of instructions has been distributed to Installer.

B. Shop Drawings:
   1. Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections.
   2. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

C. Computations: Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties, and other information needed for structural analysis.

PART 2 – PRODUCTS

2.01 MATERIALS AND COMPONENTS:

A. Metal Surfaces: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness.

B. Steel:
   1. Steel Plates, Shapes and Bars: ASTM A36, unless otherwise noted.
   2. Steel Plates to be Bent or Cold formed: ASTM A283, Grade C.
   4. Cold-Finished Steel Bars: ASTM A108, grade as selected by fabricator.
   5. Structural Steel Sheets: ASTM A570 or A611; of grade required for design loading.
   6. Galvanized Steel Sheets: ASTM A446; of grade required for design loading.
   7. Steel Pipe: ASTM A53; type E or S; Grade B; black finish unless galvanizing is required; Schedule 40 or 80 as indicated.
   8. Steel Grating: ASTM A569.
   9. Stainless Steel Bars and Shapes: ASTM A276, UNS (S30400, S40500, or S41000 with a maximum carbon content of 0.08 percent), Condition A, hot-finished or cold-finished, Class C.
2.02 FASTENERS:
A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
B. Anchor Bolts: ASTM A307, nonheaded type, unless otherwise noted.
C. High Strength Bolts, Nuts and Washers: ASTM A325-N unless otherwise noted.
D. Unfinished Threaded Fasteners: ASTM A307, Grade A.
E. Lag Bolts: Square head type, FS FF-B-561.
I. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
J. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
K. Lock Washers: Helical spring type carbon steel, FS FF-W-84.
L. Stainless Steel Fasteners:
   1. Type 303 stainless steel bolts.
   2. Type 18-8 stainless steel nuts and washers.
   3. Type 304 stainless steel wedges. M. Expansion Type Fasteners:
      a. Zinc plates according to Fed. Spec, QQ-Z-325C.
      b. Stainless steel as specified above.

2.03 FABRICATION:
A. Field Measurements:
   1. Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress.
   2. Allow for trimming and fitting wherever taking field measurements before fabrication might delay work.
B. Shop Assembly:
   1. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly.
   2. Disassemble units only as necessary for shipping and handling limitations.
   3. Clearly mark units for reassembly and coordinated installation.
C. Workmanship:
   1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product.
   2. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
   3. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 in. unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
   4. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
   5. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat-head (countersunk) screws or bolts.
6. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

7. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

D. Finishes:
1. Ferrous Metals:
   a. Remove scale, rust and other deleterious materials before applying shop coat. Clean off rust and mill scale.

2. Aluminum:
   a. Unless otherwise specified, provide standard mill finish.
   b. Provide anodic coatings where specified. Items to be anodized shall receive a polished satin finish pretreatment and a clear-lacquer overcoating.
   c. Coat aluminum surfaces which will be in contact with concrete or dissimilar metals with coal tar epoxy paint.

2.04 MISCELLANEOUS METAL FABRICATIONS:
A. Rough Hardware:
1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are to be furnished under other contracts.

2. Manufacture or fabricate items of sizes, shapes and dimensions required.

3. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

B. Ladders:
1. Fabricate ladders from structural steel for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with the requirements of ANSI A14.3 and OSHA, except as otherwise indicated.

2. Unless otherwise shown, provide ½ inch x 2-½ inch continuous structural steel flat bar side rails with eased edges, spaced 18 inches apart.

3. Provide ¾ -inch-diameter solid, anti-skid structural steel bar rungs, spaced 12 inches o.c.

4. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.

5. Support each ladder at top and bottom and at intermediate points spaced not more than 5'-0" o.c. Use welded or bolted steel brackets, designed for adequate support and anchorage and to hold the ladder clear of the wall surface with a minimum of 7-in. clearance from wall to centerline of rungs.

6. Extend rails 42 in. above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.

7. Provide sloping ladders (ship's ladders) where indicated. Fabricate of open type construction with structural steel channel or steel plate stringers, pipe handrails and open steel grating treads, unless otherwise indicated. Provide all necessary brackets and fittings for installation.

8. Galvanize ladders, brackets and fasteners where indicated, otherwise shop paint.

C. Ladder Safety Cages:
1. Fabricate ladder safety cages from structural steel flat bars, assembled by welding.

2. Unless otherwise shown, provide ¼" x 3" top and bottom hoops and intermediate hoops spaced not more than 20'-0" o.c.; ¼" x 2" hoops at 4'-0" o.c. between the 4-in. wide hoops; and ¼" x 2" vertical bars secured to each hoop. Space vertical bars approximately 9 in. o.c.

3. Fasten assembled safety cage to ladder rails and adjacent construction as indicated.

4. Galvanize ladder safety cages and fasteners where indicated, otherwise shop-paint.

D. Loose Bearing and Leveling Plates:
1. Provide loose steel bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area.

2. Drill plates to receive anchor bolts as required.

3. Galvanize after fabrication.

E. Miscellaneous Framing and Supports:
1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

2. Fabricate Miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing.

3. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection.

4. Cut, drill and tap units to receive hardware and similar items.

PART 3- EXECUTION

3.01 INSPECTION:
A. Installer shall examine the areas and conditions under which miscellaneous metal items are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 PREPARATION:
A. Furnish setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction.

B. Coordinate delivery of such items to project site.

3.03 INSTALLATION:
A. Setting Loose Plates:

2. Set loose leveling and bearing plates on metal wedges, or other adjustable devices.

3. After the bearing members have been positioned and plumbed, tighten the anchor bolts.
4. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

C. Cutting, Fitting, and Placement:
   1. Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications.
   2. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.
   3. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
   4. Fit exposed connections accurately together to form tight hairline joints.
   5. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

D. Field Welding: Comply with AWS D1.1 for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

END OF SECTION
SECTION 31 11 00

CLEARING AND GRUBBING

PART 1- GENERAL

1.1 SUMMARY
A. Work Included: Clearing work, disposal of non-salvageable material, and necessary preliminary grading as required by the Contractor, and approved by the Engineer, within the Limits of Work shown on the Drawings.
B. The Contractor shall have erosion and sedimentation control measures in place before soils are disturbed.

1.2 RELATED WORK SPECIFIED ELSEWHERE
A. Section 31 23 00: Earthwork

1.3 QUALITY ASSURANCE
A. Dispose of waste wood products by chipping and use on-site as directed by the Engineer. This material shall not be used on bottomlands of the site.
B. Requirements of Regulatory Agencies: Dispose of combustible material by burning only when permitted by and in accordance with all applicable local and State laws, ordinances, and code requirements.
C. Remove and dispose of non-salvageable structures and material in accordance with all applicable local and State laws, ordinances, and code requirements.
D. The Contractor shall have full responsibility for locating underground facilities and for coordinating his work with the Owner for the protection of underground facilities from damage. The Contractor shall repair any damage to the underground facilities at his own cost.

PART 2- PRODUCTS

2.1 MATERIALS
A. At the Contractor's option.
B. Herbicides: Use of herbicides not allowed on-site.
C. Wrapping Material:
   1. Burlap, AASHO M182
   2. Polyethylene Film, ASTM D-2103
   3. Paper
D. Wound Paint: Standard bituminous product.

PART 3- EXECUTION

3.1 PREPARATION
A. Streets, Roads, Adjacent Property and Other Works to Remain: Protect throughout the work by fences, barricades, and the exercise of special care to avoid unnecessary damage.
B. 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.

C. Existing Trees, Brush, Shrubs, Gardens, and Other Vegetation:
   1. Protect trees by properly tying off, supporting, or pre-topping and trimming as required.
   2. Protect shrubs and bushes by tying, staging, tarpaulins, net-work, fences or barricades.
   3. 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 with timber mats to avoid overly compacting the root mass.

3.2 PERFORMANCE

A. Clearing:
   1. Limits of clearing shall be all areas within contract limit lines, and as directed by the Engineer.
   2. Remove trees, shrubs, grass, weeds, and other vegetation, improvements, or obstructions that interfere with installation of new construction.
   3. Removal of trees includes new and old stumps of trees and their roots, unless specifically directed by the Engineer.
   4. Stumps Not Required to be Removed: Cut flush with ground elevation.
   5. Trees Wound Paint:
      a. Apply to all cut surfaces of trees to remain and to all surgically repaired areas damaged by construction.
      b. As recommended by the tree wound painting manufacturer for trees which are not readily affected by the standard applications.

B. Grubbing:
   1. Limits of grubbing: Coincide with the limits of clearing.
   2. Remove all stumps, roots over 1 inch in diameter, and matted roots within the limits of grubbing below the proposed road and up to 12 inches below fills.

C. Topsoil Removal:
   1. Definitions:
      a. Friable clay loam surface soil found in a depth of not less than 4 inches.
      b. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 1 inch in diameter, and without weeds, roots, and other objectionable material.
   2. Strip topsoil to whatever depths encountered, avoiding its intermingling with the underlying subsoil or other objectionable material.
   3. Remove heavy growths of grass from areas before stripping.
   4. Where trees are indicated to be left standing, stop topsoil stripping at the drip line of such trees to prevent damage to the main root system.
   5. Stockpiling:
      a. In storage piles in areas on site as directed by the Engineer.
      b. Construct to freely drain surface water.
      c. Cover, as necessary, to prevent wind-blown dust.
      d. Install silt fence around stockpile, as directed by the Engineer.

D. Disposal:
   1. Burning of materials is not allowed on site.
   2. Removal:
      a. Remove material from the site daily as it accumulates and dispose of legally.
      b. Should the Contractor elect to continue work beyond normal working
hours, do not allow material to accumulate for more than 48 hours.
3. Dumping: Dispose of material in a MDEQ approved off-site facility, or on-
site as directed by the Engineer.
4. Chipping: Reduce to dimensions of less than two inches by the use of an
approved chipping machine.

3.3 RESTORATION
A. Repair or replace trees and vegetation and restore any improvements damaged by this
work to their original condition, as acceptable to the Owner or other parties or
authorities having jurisdiction.

END OF SECTION
SECTION 31 23 00

EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY
A. This Section covers excavation, filling/backfilling, compaction, grading and temporary access for restoration of the Boardman River channel and floodplain, grading of the Brown Bridge Dam embankment. Major work elements include but are not limited to:
   1. Boardman River Restoration
      a. Excavation of soil and sediment to restore the relic river channel.
      b. Construction and maintenance of Sediment Traps for sediment management.
      c. Placement of temporary sand dams to guide the river along proposed alignments.
      d. Placement of cut material in spoil areas noted.
      e. Removal of existing vegetation within the footprint of the channel alignment.
      f. Establishment and maintenance of access routes and river crossings as needed to support earthwork.
      g. Habitat enhancement excavation.
   2. Brown Bridge Dam Removal
      a. Final grading of the dam embankment.
   B. Contractor is advised that excavation for restoration of the Boardman River channel and floodplain from the dam to the limits of work will proceed with significant construction oversight from the Engineer. A typical section has been assumed to set grading lines and limits and to quantify cut/fill volumes. Actual grades and dimensions will deviate from this section to mimic natural river features. Typical deviations include deeper bed elevations in pools with a narrower channel section and wider channel sections with shallow beds in riffle and run sections. Specific locations of these features (pools, riffles, runs) will reveal themselves as excavation encounters the proposed grade or the pre-dam channel surface, at which point field adjustment may occur. Survey shall be performed as described by Section 01 71 23 to confirm final grading and for material volume and pricing.
   B. Control of surface water run-off and run-on during construction, shall be in accordance with Sections 31 25 00 and 31 23 19.

1.2 RELATED WORK SPECIFIED ELSEWHERE
A. Section 01 11 00: Summary of Work
B. Section 01 33 00: Submittal Procedures
C. Section 02 32 13: Subsurface Drilling and Sampling
D. Section 02 41 00: Demolition
E. Section 02 42 09: Waste Removal and Handling
F. Section 02 42 10: Off-Site Transportation and Disposal
G. Section 31 23 19: Dewatering
H. Section 31 25 00: Erosion and Sedimentation Controls
I. Section 31 50 00: Excavation Support and Protection
J. Section 31 35 36: Large Wood
K. Section 31 35 33: Fabric Encapsulated Soil – Bank Treatment
L. Section 01 21 00: Allowances
1.3 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The most recent issue of each publication shall apply, unless otherwise noted. The publications are referred to in the text by the basic designation only.

1. ASTM International (ASTM):
   a. ASTM C 136 Sieve Analysis of Fine and Coarse Aggregates.
   c. ASTM D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
   e. ASTM D 2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
   f. ASTM D 3740 Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
   h. ASTM D 6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).


1.4 SUBMITTALS

A. The Contractor shall submit the following items to the Engineer in accordance with Section 01 33 00:

1. Excavation and backfill plan, including means, methods, equipment, and schedule for any work that involves excavation of soils and sediment of the site and backfill of soils/sediments, whether in spoils areas of as permanent backfill at the new channel at the dam.
   a. Submit as a component of the Work Plan, as described in Section 01 11 00.

2. Borrow Source(s):
   a. The Contractor shall provide the proposed source(s) for borrow materials prior to initiation of work.
   b. Available/previous laboratory testing data shall be provided.

3. Quality Control Testing Laboratory:
   a. The name and qualifications of an independent third-party commercial testing laboratory to be used for borrow source testing (geotechnical) and in-place soil/construction materials testing shall be submitted as soon as possible, but no later than 7 days following notice to proceed.
   b. The proposed geotechnical laboratory shall meet the requirements of ASTM D 3740.

4. Analytical Testing Laboratory:
   a. The name and qualifications of an independent third-party commercial testing laboratory to be used for contaminated soil testing (analytical) shall be submitted as soon as possible, but no later than 7 days following notice to proceed.
5. Decontamination Pad:
   a. Submit two (2) copies of the following:
      (1). Details for the decontamination pad, including location and materials.

6. Quality Control Test Reports:
   a. Submit two copies of the following reports:
      (1). Geotechnical laboratory test reports for select borrow source materials.
      (2). Field in-place density (compaction) test reports of material for backfill within the new channel at and adjacent to the powerhouse.

7. Compaction Equipment:
   a. Submit methods and equipment for compaction of soils to create final grades in spoil areas and along the embankment dam.

8. Sediment Excavation Sequencing Plan
   a. The Contractor shall submit to the Engineer for approval a description of the planned approach to excavation and disposal of the impounded reservoir sediments, including description of means and methods, equipment to be used, and sequencing with other work items such as drawdown of the headpond and dam demolition. In particular, plans for access and temporary stream crossings if necessary shall be documented. Crossings must maintain river flow and may be wet or dry depending on their frequency of use.

1.5 PROJECT CONDITIONS

A. Site Information:
   1. Survey data provided on topographic (surface, bathymetric, and depth of refusal) conditions are not intended as representations or warranties of accuracy or continuity between data points. It is expressly understood that neither the Owner, nor the Engineer will be responsible for interpretations or conclusions drawn there from by Contractor. Data are made available for the convenience and information of the Contractor.
   2. Grades and Lines provided for restoration are provided as guidance only and are expected to change. Areas for field adjustment are those areas below the bankfull elevation of the river channel and the final grades and volume of noted spoils areas.
   3. Work will occur within a dynamic riverine environment with significant changes to site conditions during the project probable. Flooding, groundwater drainage, and drawdown of the headpond will require diligent attention to site conditions on a daily basis.
   4. Subsurface information is provided for the Contractor in Attachment B. Subsurface data are not intended as representations or warranties of accuracy of subsurface conditions. It is expressly understood that neither the Owner, nor the Engineer will be responsible for interpretations or conclusions drawn there from by Contractor. Data are made available for the convenience and information of the Contractor. Additional test borings and other exploratory operations may be made by Contractor.
   5. One soil boring (minimum) shall be performed from the crest of the dam at the south abutment. Details for performance of this boring(s) are provided in Section 02 32 13.

B. Existing Utilities:
   1. The Contractor shall locate in the field existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection
during earthwork operations. Cap or fill all abandoned pipes and conduits encountered during construction with grout.

2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with the utility companies in keeping respective services in operation. Contractor shall repair damaged utilities to satisfaction of the utility owner.

C. Use of Explosives:
1. Use of explosives shall not be allowed.

1.6 PROTECTION OF FACILITIES AND SITE
A. The Contractor shall protect existing site features and structures to remain, utilities, trees, vegetation, and drainage ways which are to remain. The Contractor shall employ similar precautions, as necessary, to prevent damage to or pollution of adjoining properties or rights of way.

B. The Contractor shall use the necessary precautions to prevent damage to pipes, conduits, and other underground facilities that are to remain.
1. At a minimum, the Contractor shall notify MISS DIG System, Inc. in advance of any subsurface activities, including but not limited to excavation, trenching, grading, pavement milling, saw cutting, fence post installation, etc.

C. The Contractor shall repair and/or replace, at no additional cost, any site features, utilities, or property damaged by its employees or subcontractors during construction.

D. Protection of Persons and Property:
1. Barricade and mark open excavations occurring as part of this work in accordance with applicable standards.
2. Protect structures, utilities, sidewalks, pavements, and other facilities designated to remain from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations and truck traffic.

E. Any equipment operating within the river shall utilize a non-petroleum based hydraulic fluid. Hydraulic fluid shall be Chevron Clarity or approved equivalent.

1.7 DEFINITIONS
A. Contaminated Soils/Sediments:
1. Contaminated soils/sediments are not anticipated to be encountered during the work. Contaminants soils/sediments are those materials that become contaminated as a result of the work due to fuel or hydraulic spills.

B. Unsatisfactory Soil/Material:
1. Unsatisfactory soils/materials include but are not limited to peat and/or highly organic soils (classified as OL, OH, or Pt by ASTM D 2487), stumps/brush, trash, refuse, debris, frozen soils, contaminated soils that do not meet site re-use criteria, soils containing materials greater than the allowable size (see below), saturated soils, fine-grained soils above their liquid limit at the time of compaction, and soils which are either too wet or too dry to compact, as determined by the Engineer.

C. Construction Demolition Debris:
1. Demolition debris consists of concrete, brick, wood, metal, glass, any other deleterious former construction product.

D. Satisfactory Soil/Material:
1. Satisfactory soils/materials shall meet the requirements specified in this Section, and shall be used in areas as shown on the Construction Drawings or as directed by the Engineer.

E. Cohesionless and Cohesive Soils:
1. Cohesionless soils include gravels, sand-gravel mixtures, sands, and gravelly-sands, classified as GW, GP, SW, or SP by the Unified Soil Classification System (ASTM D 2487).

2. Cohesive soils include clayey gravels, sand-clay mixtures, clayey sands, clays, and silts, classified as GC, SC, CL, CH, ML, or MH by the Unified Soil Classification System (ASTM D 2487). Soils classified as GM and SM will be identified as cohesionless only when the fines are determined to be non-plastic.

3. Testing required for the classification of soil shall be in accordance with ASTM D 4318, ASTM C 136, and ASTM D 422.

F. Degree of Compaction:
1. Degree of compaction (percent compaction) required is expressed as a percentage of the maximum dry density, at the optimum moisture content.
2. The maximum dry density and optimum moisture content shall be obtained by the test procedure presented in ASTM D 1557 (Modified Proctor).

G. Organic Soil:
1. Excavated impoundment material having a visibly darker coloration indicating the presence of organic materials within the matrix.

H. Sand Soil:
1. Excavated impoundment material composed completely of sand or other coarse particles without any visible indication of organic material within the matrix.

I. Pilot Channel:
1. The area of cut required to expose the pre-dam channel bed and banks only, without any excavation of the floodplain areas beyond the bank edges. Daylight slopes would be 2:1.

J. Floodplain:
1. The area lying adjacent to and above the top of bank of the main river channel.

K. River Channel:
1. The bed and banks that contain normal flow of the river

L. Pre-Dam Channel
1. The Boardman River channel that existed before the Brown Bridge dam was built

M. Average Section:
1. The average section is the template used to establish grading. It consists of a 55 foot bottom channel width, 2.8 foot bank height (average), 40 feet (total) floodplain width – divided unevenly along the left and right sides of the channel. All cut slopes are 3H:1V (horizontal to vertical) unless steeper native slopes are encountered.

N. Bankfull Channel:
1. The channel bed and banks lying below the top of bank elevation also considered the floodplain elevation. This is the channel that carries normal water flow.

1.8 QUALITY ASSURANCE
A. Codes and Standards:
1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.9 SOURCE QUALITY CONTROL TESTING
A. Borrow source testing shall be conducted on all soil materials proposed for construction. The Contractor shall subcontract the services of an independent, third-party geotechnical laboratory testing and inspection service to perform testing of any borrow material to be furnished by the Contractor as specified below.
1. Common Borrow:
1.10 MANAGEMENT OF EXCAVATED MATERIALS

A. Some or all of this soil that is excavated to support Powerhouse demolition or embankment regarding may be reclaimed for re-use as backfill to achieve final grades provided it meets the requirements of Common Borrow, as determined by the Engineer.

B. The Contractor shall determine if excavated soil/sediment that appears to be contaminated requires testing and characterization prior to off-site disposal or re-use.

C. The Contractor shall ensure required waste characterization has been completed to the satisfaction of the pre-designated treatment, storage, and/or disposal facility (TSDF) prior to transporting material for off-site disposal for any contaminated soils/sediments.

D. Waste removal, handling, and management shall be in accordance with Section 02 42 09.

E. Transportation and disposal of excavated materials that require off-site disposal shall be in accordance with Section 02 42 10.

PART 2 - PRODUCTS

2.1 COMMON BORROW

A. Common Borrow shall be used, as necessary, to supplement excavated soils to be placed to achieve final grades of the dam embankment as shown on the drawings.

B. Common Borrow shall consist of earth, suitable for embankment construction, and shall be free from frozen materials, perishable rubbish, peat, and other Unsatisfactory Soil/Material. Common Borrow shall meet the following gradation requirements:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inch</td>
<td>100</td>
</tr>
<tr>
<td>1 inch</td>
<td>90-100</td>
</tr>
<tr>
<td>No. 4</td>
<td>50-100</td>
</tr>
<tr>
<td>No. 40</td>
<td>20-75</td>
</tr>
</tbody>
</table>
C. Common Borrow shall be of such a nature and character that it can be compacted to the specified density (Subsection 3.8).
D. The moisture content shall be sufficient to provide the required compaction in subsection 3.8. In no case shall the moisture content exceed 4% above optimum, which shall be determined in accordance with ASTM D1557.
E. Common Borrow, whether from off-site borrow or re-claimed material from the project site, must meet soil use and re-use criteria specified in subsection 1.7.D of this Section.

2.2 GRANULAR BORROW
A. Granular Borrow shall be used to backfill the channel at the powerhouse and dam between Stations 2+40 and 4+35 as shown on the Drawings.
B. Granular Borrow shall consist of earth, suitable for embankment construction, and shall be free from frozen materials, perishable rubbish, peat, and other Unsatisfactory Soil/Material. Granular Borrow shall meet the following gradation requirements:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-inch</td>
<td>100</td>
</tr>
<tr>
<td>1-inch</td>
<td>65-100</td>
</tr>
<tr>
<td>No. 4</td>
<td>35-85</td>
</tr>
<tr>
<td>No. 200</td>
<td>0-5</td>
</tr>
</tbody>
</table>

C. May be obtained as reclaimed material on site if it meets the material gradation requirements.

2.3 AGGREGATE BASE
A. Aggregate Base shall be used as borrow fill for reinforcement or surfacing of temporary access roads and as temporary fill for installation of temporary culverts along the temporary access road.
B. Aggregate Base shall consist of earth, suitable for embankment construction, and shall be free from frozen materials, perishable rubbish, peat, and other Unsatisfactory Soil/Material. Aggregate Base shall meet the following gradation requirements:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
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<td>No. 4</td>
<td>35-85</td>
</tr>
<tr>
<td>No. 200</td>
<td>0-5</td>
</tr>
</tbody>
</table>

2.3 BULK BAGS
A. Bulk bags shall be constructed from woven polypropylene fabric. Bulk Bags shall have a minimum capacity of 3000 pounds. Bulk Bags shall be a Spread Strap container with 28-inch by 28-inch base as manufactured by Bag Corp, or approved equal.

2.4 OIL ABSORBENT BOOMS
A. Shall be 5-inch, minimum, diameter and constructed of an outer mesh that contains oil absorbent filler material.
B. Shall be capable of absorbing all hydrocarbons including, oil, gasoline, diesel and lubricating oils.
C. Shall not sink when saturated with oil.
D. Shall be of a length that to span the active flow of the river

PART 3 - EXECUTION

3.1 INSPECTION
A. Examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the Engineer, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 EXCAVATION
A. General excavation consists of removal, handling/management, placement or disposal of material encountered during the following Site activities:
   1. Boardman River Restoration
   2. Brown Bridge Dam Removal

B. Excavation of Impoundment Sediment:
   1. Ensure all controls are available or in place, including oil-absorbent booms, turbidity curtain, flow exclusion barriers, and sediment traps.
   2. Approximate excavation depths and dimensions are provided on the drawings. The Engineer will provide oversight to interpret field conditions uncovered during excavation. Depth of excavation should be guided by elevations noted in the drawings as well as the presence of stumps or gravels indicating the position and elevation of the pre-dam river channel. Excavation shall not proceed below coarse bed material (gravel) or tree roots without the approval of the Engineer as these are indicators of the pre-dam surface. Excavated spoils should be cast onto the floodplain then moved to disposal areas or spoiled directly in spoils areas if feasible.
   3. Excavate channels to the extent practical along the proposed alignment outside of the current river location before drawdown of the headpond. If necessary, priority should be placed on vertical excavation to expose the channel before excavating to expose the floodplain. Extent of excavation before drawdown of the headpond will be determined by site conditions. Channel flow should be trained along the proposed alignment in all areas above Station 88+50 before drawdown begins.
   4. During drawdown ensure sediment transport by the river occurs within acceptable limits to expected elevations within the channel and collected in traps. Excavation should proceed in an upstream to downstream direction.
   5. As drawdown reaches elevation 785 feet, assess equipment access to areas between Station 55+00 and 85+00 to install sediment trap near Station 55+00.
   6. Excavation below station 85+00 and to approximately Station 55+00 will be determined by the Engineer as the surface is revealed following drawdown. Determination of this area of work will take no less than 3 working days (excluding weekends). Average channel dimensions in this section will be guided by the average section, with a 55-foot channel bottom width, 2.8-foot bankfull depth, and 40-foot total floodplain width, split unevenly between the left and right bank of the channel. All slopes will be cut at 3:1 unless native slopes to be exposed are steeper. Excavation of this section will commence in an upstream to downstream direction.
   7. Channel excavation near the dam embankment will remove known and accumulated sediment to the maximum extent practical before removing the final barrier to flow at the dam.
8. Removal of obstructions and undesirable materials in excavation includes, but is not necessarily limited to, removal of old foundations, existing construction, logs, riprap, and any other materials which may be concealed beneath the waterline or present grade, as required to perform the Work as indicated on the Drawings. If undesirable material and obstructions are encountered during excavation, remove material and replace as directed by the Engineer.

9. Impounded sediments to be excavated may consist of cobble, gravel, sand and silts. Varying soil moisture contents will be encountered during the excavation. The Contractor shall be equipped to handle excavation with moisture content ranging from dry to very wet during excavation, handling, loading, transport and disposal.

10. Excavated material with some organic content may be stockpiled if feasible and placed as the top lift in spoils areas to promote vegetation growth. This approach is not required, and will only be utilized if resulting in no additional cost to the project as determined by the Contractor in association with the Engineer.

11. Excavated materials not earmarked for salvage, stockpile and reuse shall be disposed at the excavation spoils disposal site designated on the Drawings, and marked in the field by the Engineer. The Contractor shall spread or shape the spoils at the disposal site as necessary to complete the work.

12. Do not carry excavations beyond that shown on the Drawings except as directed by Engineer. No extra compensation will be made to Contractor for excavation beyond the grades shown on the drawings without prior approval by the Engineer.

13. The Contractor is required to furnish and maintain all temporary stream crossings as necessary and remove them from river following construction.

C. Sediment traps shall be excavated at locations shown on drawings or as approved by the Engineer. Traps shall be in place prior to the start of drawdown, unless covered by water in which case they will be constructed when headpond elevations allow access.

1. Sediment Traps shall induce a pool of water at a minimum 3 foot deep by 120 foot long by 55 feet wide.
2. Pool depth may be maintained by using Bulk Bags, or equal, as a weir to control optimal water depth.
3. Monitoring shall ensure flow does not erode around Bulk Bags and compromise water control.
4. Traps shall not be excavated beyond the pre-dam channel elevation unless approved by the Engineer. If excavation below pre-dam or proposed grades as indicated in the Plans occur, coarse material will be stockpiled and replaced to original grades following construction.
5. Sediment traps shall be maintained by periodically removing accumulated sediment. Sediment traps shall be maintained as required to reduce the transport of sediment within the project area.
6. Sediment spoils excavated during sediment trap construction or maintenance shall be placed in spoil areas as shown on the drawings.

D. Construction of Spoil Areas:

1. No material shall be spoiled outside of the areas noted on the Drawings without approval by the Engineer.
2. Construct embankments and fills at locations and to lines and grades indicated or as directed by Engineer.
3. Compact as required to obtain specified density. Control moisture for each layer necessary to meet requirements of compaction.
4. Vegetation material removed from excavation areas or found in place may be buried in spoils areas with Engineer approval.
5. Aerial extent of spoils areas is critical. Do not deviate without approval by the Engineer.
6. Spoil areas grades may be adjusted in the field by the Engineer to maximize material handling efficiency.
8. Maximum slopes of Spoil areas must not exceed 4H:1V.

E. Habitat Enhancement Excavation:
1. Following completion of dam removal and major excavation within the impoundment, additional excavation work may be required to re-establish habitat features in the channel (pools and riffles) as shown on the Plans.
2. Work will be “fit in the field” at the direction of the Engineer.
3. Work typically proceeds with an excavator and track dump for hauling if necessary.
4. Existing spoils areas will be used to waste material.

F. Embankment Dam Excavation:
1. The Contractor shall excavate to the vertical and horizontal limits defined on the Construction Drawings to facilitate the demolition of the powerhouse and removal of portions of the embankment dam to form the new river channel.
2. Permanent stable excavation slopes shall be maintained as describe on the Drawings and in subsection 3.3 of this Section.
3. Excavated soils shall be stockpiled on-site and re-used as appropriate to achieve final grading of the channel at the embankment dam provided that the soils meet backfill criteria.

3.3 STABILITY OF EXCAVATIONS
A. Slope sides of excavations shall comply with applicable codes and ordinances. Shore and brace where sloping is not possible because of space restrictions, stability of material excavated, or where protection of adjacent structures is required.
B. Maintain sides and slopes of excavations in a safe condition until completion of backfilling, or longer if specified or directed by the Engineer.
C. Where excavation sidewalls cannot be sloped properly to meet safety requirements, excavations must be supported by an engineered shoring system in accordance with Section 31 50 00.
D. The Contractor shall barricade areas within the influence of excavation to preclude access or vehicle traffic/operations.

3.4 SOIL/MATERIAL HANDLING AND STORAGE
A. During daily excavation activities, locate and retain soil materials away from edge of excavations. All temporary/daily stockpiles shall be maintained a sufficient distance from the excavation to prevent surcharge loading of the slope and to provide for stability of the slope.
B. During excavation, demolition debris shall be segregated from contaminated soil/sediment that must be disposed of off-site, and from reclaimed soil that meets site Common Borrow specification guidelines. All waste soils and materials shall be handled in accordance with Section 02 42 09.
C. The Contractor shall direct load and unload soil/materials into and from trucks to the extent possible to minimize on-site storage of soil/materials.
D. Designated storage(stockpile areas shall be established for the following soils/materials, as required:
   1. Demolition debris;
   2. Reclaimed soil for re-use as material for Common Borrow backfill;
   3. Imported borrow soil and aggregate that meets criteria for use on site; and
4. Soil and sediment that will be placed in spoils areas on site.

E. The Contractor shall place, grade, and shape stockpiles to provide for proper drainage. Stockpiles shall incorporate appropriate erosion and sedimentation controls in accordance with Section 31 25 00 to prevent the off-site migration of sediments. Stockpiles shall be located, shaped, and managed so as to prevent run-on from entering the stockpile and run-off from entering the excavation.

F. Dispose of excess soil and sediment as specified herein at spoils areas, and dispose of contaminated material and waste soil/materials as specified herein and in accordance with Section 02 42 10.

3.5 COLD WEATHER PROTECTION
A. Protect excavation bottoms against freezing if filling is to be performed on that surface when atmospheric temperature is less than 35°F.

3.6 CLOSING ABANDONED UNDERGROUND UTILITIES
A. Close open ends of abandoned underground utilities, indicated to remain, permanently with closures sufficiently strong to withstand pressures which may result after closing.

B. Close open ends of metallic conduit and pipe with threaded galvanized metal caps or plastic plugs, or other suitable method for the type of material and size of pipe. Do not use wood plugs.

C. Close open ends of concrete and masonry utilities with not less than 8-inch thick brick masonry bulkheads, constructed to completely fill the opening.

1. Wet brick before laying. Lay brick in mortar so as to form a full bed with ends and side joints in one operation. Joints shall not be more than 3/8 inch wide. Protect fresh masonry from freezing or from rapid drying, as necessary, and maintain protection until mortar has set.

3.7 GRADING
A. The Contractor shall uniformly grade areas within the limits of work for the channel, floodplain embankment regrading, and spoils areas 6 and 7.

B. At the embankment dam, smooth finished surface within 0.1 foot (horizontal and vertical), compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. Finish surfaces to be free from irregular surface changes.

C. In the remaining spoils areas rough and irregular surfaces are acceptable, provided a stable fill is constructed.

D. Channel dimensions are expected to change during construction and will be guided by the Engineer. Grading above the bankfull elevation of the channel is expected to incur less adjustment.

E. Finished slopes along the daylight edge of the floodplain and within the spoils areas are critical to maintaining the stability of material. When completed, the average plane of the slopes shall conform to the slopes indicated on the Drawings, and no point on the completed slopes shall vary from the designated plane by more than 0.5 feet measured at right angles to the slope, unless directed or approved by the Engineer.

3.8 BACKFILL AND FILL PLACEMENT AND COMPACTION
A. General:

1. Obtain approval from Engineer with regard to suitability of soils and acceptable subgrade prior to subsequent operations.

2. Provide system necessary to successfully complete excavation, compaction and construction requirements.
3. Place satisfactory soil material in layers to required subgrade elevations.
4. Do not place backfill or fill material within the limits of the new channel on surfaces that are muddy, frozen, or contain frost or ice.

B. Fill/Backfill Placement Near Embankment Dam:
1. Place Common Borrow materials in loose layers not more than 1-foot in loose thickness, unless otherwise specified.
2. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content.
3. Compact Common Borrow to at least 92 percent of the material’s maximum dry density as determined by ASTM D1557.
4. Compact Granular Borrow to at least 92 percent of the material’s maximum dry density as determined by ASTM D1557.
5. Compact Aggregate Base to at least 92 percent of the material’s maximum dry density as determined by ASTM D1557.

C. Backfill in Spoils Areas: Compact each layer at spoils areas with a minimum of three passes of the compaction to at least 92 percent of the material’s maximum dry density as determined by ASTM D1557.

D. Place backfill and fill materials evenly to required elevations.

3.9 FIELD QUALITY CONTROL TESTING
A. Field testing shall be conducted on all soil materials during construction. The Contractor shall subcontract the services of an independent, third-party geotechnical laboratory testing and inspection service to perform testing of any borrow material to be furnished by the Contractor as specified below.
1. Common Borrow:
   a. Particle-Size Analysis (combined sieve/ hydrometer) ASTM D 422
   b. Atterberg Limits ASTM D 4318
   c. Proctor (Modified) ASTM D 1557
   d. Density ASTM D 6938

2. Excavated Embankment Spoils and Channel/Floodplain Regrading Spoils:
   a. Particle-Size Analysis (combined sieve/ hydrometer) ASTM D 422
   b. Atterberg Limits ASTM D 4318
   c. Proctor (Modified) ASTM D 1557
   d. Density ASTM D 6938

3. Granular Borrow:
   a. Particle-Size Analysis ASTM D 422
   b. Proctor (Modified) ASTM D 1557
   c. Density ASTM D 6938

4. Aggregate Base:
   a. Particle-Size Analysis ASTM D 422
   b. Proctor (Modified) ASTM D 1557
   c. Density ASTM D 6938
Notes:
1. Other testing methods may be considered acceptable, based on prior approval of the Engineer.
2. Testing frequency shall be as listed, at any change in borrow source, or at any discernable change in material delivered to the site (as determined by the Engineer).
3. Three tests per lift for every 5,000 square foot of material placed.

B. The Engineer will establish or designate control points for the work as follows:
1. The horizontal and vertical control monuments designated by the Engineer will consist of at least four monuments with horizontal and vertical coordinates.
2. Provide without charge, such competent person, tools, stakes, and other materials as Engineer may require in establishing or designating control points; in establishing construction easement boundaries; or in checking layout, survey, and measurement of work performed by the Contractor.

C. Provide all additional survey, layout, and measurement work required in accordance with Section 01 71 23.
1. Work performed by a qualified professional engineer or registered land surveyor acceptable to the Engineer.
2. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.
   a. Make no changes or relocations without prior written notice to the governing agency.
   b. Report to Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
   c. Require surveyor to replace Project control points and all Federal, State, City, County and private land monuments that may be lost or destroyed.
      a) Establish replacements based on original survey control.
      b) Comply with local and State requirements for monument replacement and restoration.
3. Establish lines and levels, locate and lay out by instrumentation and similar appropriate means.
4. Periodically verify layouts by the same methods.
5. Maintain a complete, accurate log of all control and survey work as it progresses.
6. On request of the Owner, submit documentation to verify accuracy of field engineering work.

3.13.1 EARTHWORK TOLERANCES

A. Channel dimensions are expected to change during construction and will be guided by the Engineer. Grading above the bankfull elevation of the channel is expected to incur less adjustment.

A. Finished slopes along the daylight edge of the floodplain and within the spoils areas are critical to maintaining the stability of material. When completed, the average plane of the slopes shall conform to the slopes indicated on the Plans, and no point on the completed slopes shall vary from the designated plane by more than 0.5 feet measured at right angles to the slope, unless directed or approved by the Engineer.

3.10 MAINTENANCE

A. Protection of Graded Areas:
1. Protect newly graded areas from traffic and erosion.
2. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas:
   1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and recompact as specified in subsections 3.7 and 3.8.

3.11 DISPOSAL OF EXCESS AND WASTE MATERIALS
A. Removal from Site:
   1. Remove waste materials, including excess and unacceptable excavated material, trash and debris, and properly dispose of it off the property in accordance with Section 02 42 10.

END OF SECTION
SECTION 31 23 19
DEWATERING

PART 1 - GENERAL

1.1 SUMMARY
A. The Contractor shall furnish all labor, equipment, and materials necessary for the control, collection, handling, and/or disposal of ground and surface water entering trenches, excavations, any braced/sheeted excavations, and the temporary headpond drawdown structure/cofferdam. Work includes, but is not limited to, the following at locations specified to be performed in the dry:
   1. Furnishing, operating, and maintaining dewatering equipment;
   2. Temporary on-site sedimentation of all water collected from dewatering operations; and
B. Excavations will in many cases extend below the groundwater surface and headpond levels, and in many areas extend to the groundwater surface. Locations in which excavation shall be performed in the dry are indicated on the Drawings. Such areas include, but are not limited to, the bottom 5 feet of soil excavation at the powerhouse at the discretion of the Contractor, and excavation within the limits of the in-place temporary headpond drawdown structure.
C. All backfill shall be performed in the dry.
D. The lower 5 feet minimum of excavation at the powerhouse below elevation 765 feet may be performed in the dry at the discretion of the Contractor. Backfill to final grade must be performed in the dry, will require local diversion of river flow using berms or temporary cofferdams to allow flow diversion to either side of the proposed/new channel.
E. Contractor shall coordinate with Engineer to identify needs for dewatering and surface water control to facilitate the work.

1.2 RELATED WORK SPECIFIED ELSEWHERE
A. Section 01 11 00: Summary of Work.
B. Section 01 33 00: Submittal Procedures.
C. Section 02 42 09: Waste Removal and Handling.
D. Section 02 42 10: Off-Site Transportation and Disposal.
E. Section 31 23 00: Earthwork.

1.3 SUBMITTALS
A. The Contractor shall submit the following items to the Engineer in accordance with Section 01 33 00:
   1. Excavation dewatering plan, including means, methods, equipment, and schedule for any work that extends below the groundwater surface or headpond water level. The dewatering plan shall include dewatering measures to effectively dewater the temporary headpond drawdown structure.
      a. Submit as a component of the Work Plan, as described in Section 01 11 00.
   2. Temporary cofferdam system for dewatering to allow placement of backfill for the new channel at the powerhouse.

PART 2 - PRODUCTS
2.1 GENERAL
A. Contractor shall provide equipment and materials necessary to remove water from excavations, trenches, and cofferdams using pumps, drains, well points, piping, and any other facilities necessary to keep the excavations and trenches free of water, as approved by the Engineer.
1. Have spare equipment available for immediate use in the event of equipment breakdowns.

2.2 MATERIALS
A. Dewatering Equipment and Supplies:
1. As necessary, best adapted to design and construction requirements.
B. Temporary Cofferdams:
1. Shall consist of Aqua-Barrier™ Temporary Water Inflated Dams or Portadam™ temporary cofferdam system to place backfill near the powerhouse for the proposed/new channel.

PART 3 - EXECUTION

3.1 PERFORMANCE
A. General:
1. Contractor shall perform construction dewatering as required to facilitate and complete the Work, as described herein and approved by the Engineer.

B. Damage:
1. The Contractor shall be responsible to any and all damage resulting from the dewatering operations or the failure to maintain the Work that is specified to be performed in the dry in a suitable dry condition.
2. Take all necessary precautions to protect new work and excavation from flooding during storms or from other causes.

3.2 CONSTRUCTION DEWATERING
A. Contractor shall dewater excavations, trenches, and other parts of the construction site that is specified to be performed in the dry to keep free of standing water, to prevent sidewall sloughing, to mitigate subgrade softening, piping, and/or heave, and/or to prevent excessively muddy conditions.
1. Dewatering methods that cause a loss of fines will not be permitted.
2. Direct discharge to storm drain systems, sewer systems, to watercourses downstream of the dam, or over land downstream of the dam is not allowed.

B. Furnish, install, operate, and maintain all drains, sumps, pumps, and other equipment needed to perform construction dewatering as specified.

C. Diversion Berms and Temporary Dewatering Cofferdams:
1. Design, construct, maintain, and remove diversion berms where necessary for diverting runoff away from open excavations and trenches to minimize the generation of waste water if other than Aqua-Barrier™ Temporary Water Inflated Dams or Portadam™ temporary cofferdam system.

2. Construct, maintain, and remove diversion berms where necessary for diverting runoff away from open excavations and trenches to minimize the generation of wastewater if Aqua-Barrier™ Temporary Water Inflated Dams or Portadam™ temporary cofferdam system used.

3. Design and construct diversion berms to withstand all imposed loads to prevent...
damage to adjacent structures or property.

D. Temporary Under Drains:
1. When necessary, lay temporary under drains in the excavation.
2. Excavate trenches to suitable dimensions to provide space for the under drains and surrounding gravel.
3. Install under drains a distance of at least 3 inches below the bottom of the pipe or structure and the top of the bells of the under drain pipes.
4. Under drain pipe shall be concrete, HDPE, or PVC pipe of standard thickness with open joints wrapped in geotextile fabric to prevent the admission of sand and other soil. Sewer pipe of the quality known as "seconds" will be acceptable.
5. Entirely surround the under drain and fill the space between the under drain and the pipe or structure with crushed stone.
6. Compact the crushed stone, if necessary, and leave the surface suitable for laying the pipe or building the structure.

3.3 TEMPORARY ON-SITE SEDIMENTATION
A. All water collected by dewatering systems near the powerhouse shall be contained within the temporary sedimentation basin, and allowed to flow back to the channel upstream of the dam.

3.4 SAMPLING, TESTING, AND CHARACTERIZATION
A. All contaminated water shall be sampled, tested, and characterized as specified in Section 02 42 09.

3.5 TRANSPORTATION AND DISPOSAL
A. Transportation and/or disposal of contaminated water shall be in accordance with Section 02 42 10.

3.6 REMOVAL OF TEMPORARY WORKS
A. After the temporary works have served their purpose, remove them or level and grade them to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.
B. Except as otherwise specified, remove any temporary under drain pipes.

END OF SECTION
SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 – GENERAL

1.1 SUMMARY

A. The Contractor shall provide necessary erosion and sedimentation controls for the Work, in accordance with the Soil Erosion and Sedimentation Control Plan (SESC Plan) prepared for the project by the Engineer. The Contractor shall conduct the Work in a way that preserves and protects the erosion and sedimentation controls provided by the Contractor.

B. Contractor is responsible for preparing, paying all fees, and obtaining a soil erosion and sedimentation control permit from the Grand Traverse County Drain Commissioner in accordance with Part 91 of Michigan Act 451, as amended. The Contractor shall provide sufficient time for obtaining a permit to meet the project schedule. A copy of the permit shall be provided to the Engineer.

B. Contractor shall provide and install all materials, equipment, and labor necessary for the removal of storm runoff/surface water and to place erosion and sedimentation control measures in accordance with the applicable erosion and sediment control regulatory requirements and standards, as shown on the Drawings and specified herein. At the completion of the construction, provide all materials, equipment, and labor necessary for the removal, transport and disposal of temporary erosion and sediment control structures not specified to remain. Downgradient from disturbed areas, remove, transport, and dispose of sediment resulting from erosion control measures in a manner consistent with overall intent of this specification and which does not result in additional erosion.

C. Provide and install all erosion and sediment control measures in accordance with the applicable erosion and sediment control regulatory requirements, standards and specifications and as required by field conditions during the execution of the Work. Replace any SESC control which is damaged or shows signs of deterioration. Conducting the Work in accordance with the control measures shown on the Drawings does not relieve the Contractor of responsibility for completing the Work in a manner that minimizes erosion when field conditions occur that require additional or different measures.

D. Temporary erosion and sediment control measures shall be installed as the first step in construction, shall be continuously maintained, and shall not be removed until permanent surface stabilization of all disturbed areas is to the Engineer’s satisfaction.

E. Permanent controls or surface stabilization shall commence within 14 days of completion of filling and grading activities.

F. Not all erosion and sedimentation control measures described in this specification are shown or referenced on the Drawings. Other measures as described and specified herein may be used to augment the proposed measures referenced on the Drawings based on actual field conditions encountered.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 33 00: Submittal Procedures.

B. Section 31 23 00: Earthwork.

C. Section 31 23 19: Dewatering.

D. Section 32 90 00: Plantings.

1.3 REFERENCES AND GUIDELINES
B. Michigan Department of Technology, Management & Budget “Soil Erosion and Sedimentation Control Guidebook”.
C. Part 91 of Public Act 451 of 1994, Natural Resources and Environmental Protection Act, Soil Erosion and Sediment Control.

1.4 REVIEW AND/OR INSPECTION OF SEDIMENTATION CONTROL MEASURES
A. All construction under this project shall be subject to review and/or inspection by the appropriate local, State, and Federal agencies responsible for ensuring the adequacy of sedimentation control measures.
B. Certified Operator: The Contractor shall provide an individual certified by the State of Michigan as a Certified Storm Water Operator for Construction Sites to fulfill the requirements for coverage under the State’s regulations for storm water discharges from construction sites.
C. Termination of Coverage: The Contractor shall be responsible for notifying the appropriate agencies, upon completion of work that the Soil Erosion and Sedimentation Control Permit are no longer needed and should be terminated. This notification shall be made in writing.

1.5 SUBMITTALS
A. The Contractor shall submit the following items to the Engineer in accordance with Section 01 33 00:
   1. Details and methods that the Contractor will use to follow the Engineer’s SESC Plan and these specifications, including means, methods, equipment, and schedule. The Contractor’s SESC Plan shall include dewatering measures to effectively mitigate erosion and sedimentation issues at and downstream of the site.
      a. Submit as a component of the Work Plan, as described in Section 01 11 00.
B. The Contractor shall provide copies of the following documents to the Engineer:
   1. The certificate issued by the State of Michigan for the Contractor’s State of Michigan Certified Soil Erosion Construction Stormwater Operator.
   2. Reports required pursuant to Permits.
C. The Contractor is responsible for any spill and subsequent clean-up resulting from their performance of the tasks in this specification. Contractor shall submit a Spill Control and Contingency Plan that identifies general procedural steps, notification to local fire department, upwind requirements, minimizing construction excavation, isolating and containerizing, absorption and disposal, and decontamination at a minimum for any petroleum products, chemicals, or sanitary wastes. Submit as a component of the Work Plan, as described in Section 01 11 00.

1.06 FINES FOR DEFICIENT SESC CONTROLS
A. The Contractor shall comply with the SESC Plan and permit requirements, and corrective actions. Failure to comply with the requirements or corrective actions shall subject the Contractor to a fine levied by the Grand Traverse County Drain Commissioner and actual damages for each day of non-compliance. The Contractor is solely responsible for payment of any fines levied by regulatory agencies.
PART 2 – PRODUCTS

2.1 MATERIALS

A. Silt Fence:
   1. Fabric – Silt fence geotextile shall meet the following properties:

<table>
<thead>
<tr>
<th>Fabric Properties</th>
<th>Minimum Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grab Tensile Strength (lbs)</td>
<td>100</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Elongation at Failure (%)</td>
<td>15</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Mullen Burst Strength (psi)</td>
<td>250</td>
<td>ASTM D3786</td>
</tr>
<tr>
<td>Puncture Strength (lbs)</td>
<td>50</td>
<td>ASTM D4833</td>
</tr>
<tr>
<td>Slurry Flow Rate (gal/min/sf)</td>
<td>0.2</td>
<td>ASTM D44911</td>
</tr>
<tr>
<td>Equivalent Opening Size (mm)</td>
<td>0.60 to 0.90</td>
<td></td>
</tr>
<tr>
<td>Ultraviolet Stability (%)</td>
<td>70 at 500 hours</td>
<td>ASTM D4355</td>
</tr>
</tbody>
</table>

   2. Fence Posts – The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a cross-sectional area of 3.0 square inches. Steel posts will be standard “T” or “U” section weighing not less than 1.0 pounds per linear foot.

   3. Wire fence for reinforced silt fence (fabricated units) – Wire fencing shall be a minimum 14-1/2 gauge with a maximum 6-inch mesh opening.

   4. Prefabricated reinforced silt fence – Envirofence or approved equal may be used for reinforced silt fence in lieu of reinforced fence fabricated with wire fence.

B. Wood Slurry Mulch (Hydro Mulch)
   1. Wood slurry mulch (hydro mulch) shall be as described by Section 32 90 00.

C. Hay Bales: Hay bales shall consist of rectangular-shaped bales of hay or straw weighing approximately 40 pounds per bale and shall be free from primary noxious weed seeds and rough or woody materials.

D. Temporary Protective Sheeting: Temporary sheeting material shall consist of minimum 6-mil polyethylene sheeting or a suitable approved alternative and of sufficient size to minimize seams.

E. Seed for Erosion Control:
   1. Seed for erosion control shall be as described by Section 32 90 00.

F. Filter Berm:
   1. Filter berms for use as temporary erosion and sedimentation control shall consist of shredded bark, stump grindings, composted bark, or acceptable manufactured products. Wood and bark chips, ground construction debris or reprocessed wood products will not be acceptable as the organic component of the mix.

   2. Erosion control mix shall contain a well-graded mixture of particle sizes and may contain rocks less than 4 inches in diameter. Erosion control mix must be free of refuse, physical contaminants, and material toxic to plant growth.

   3. Materials shall be consistent with those specified in Section 32 90 00.

G. Turbidity Curtain
   1. Turbidity Curtain shall be Parker Systems, Inc., SiltMaster, Type III silt curtain or approved equal.

      a. The turbidity curtain shall include a 10 feet, minimum, depth pervious geotextile filter screen.

      b. Section connections may be laced or slotted tube.

      c. Upper tension member shall include ¼ inch galvanized steel cable.

      d. Lower tension member shall be 3/8 inch chain.
PART 3 - EXECUTION

3.1 PERFORMANCE

A. It is the Contractor's responsibility to implement and maintain erosion and sedimentation control measures which effectively prevent accelerated erosion and sedimentation.

B. Contractor’s earth moving activities shall be conducted in such a manner as to prevent accelerated erosion and sedimentation.

C. Land disturbance shall be kept to a minimum outside of those areas requiring earthwork and regrading. Stabilization activities shall be scheduled immediately after any disturbance.

D. Diverting Surface Water:
   1. Contractor shall build, maintain, and operate any temporary berms, ditches, channels, flumes, sumps, and other temporary diversion and protection works needed to divert surface water through or around the work area and away from Work until surface stabilization has occurred.
   2. Storm runoff from disturbed areas must discharge through temporary erosion control measures shown on the Drawings prior to discharge from the site.

E. Erosion Control Provisions (by Contractor, as necessary):
   1. Protect areas where existing banks are to be disturbed by constructing straw/hay bale or earth dikes at the top of slope to divert storm runoff from the disturbed area or at the toe of the slope to retain sediments, as conditions permit.
   2. All discharge from any necessary pumping operations during dewatering operations shall be conveyed to an on-site sedimentation basin. No pumped water shall be released as surface water or to the on-site stormdrain system. Refer to additional requirements in Section 31 23 19.
   3. Prior to removal of sediment barriers, remove retained silt or other materials at no additional cost to the Contract.

F. Silt Fence: Contractor shall install silt fence if required as a supplementary measure. The silt fence shall be installed on a level line (parallel to contours) to avoid concentrated flow areas along the fence. The area below the fence must be undisturbed or stabilized.

G. Temporary Protective Sheeting: Soil stockpiles shall be protected with sheeting prior to forecasted significant rain events (0.5 inches or more) or as conditions require based on observed slope conditions. Overlap adjacent sheets by a minimum of 12 inches and securely anchor sheeting with sand bags and/or soil pegs, staples or stakes.

H. Filter Berms: Sediment barriers constructed from berms of erosion control mix, compost/bark, or compost-filled filter socks maybe used at locations suitable for their use and as approved by the Engineer.

I. Mulch: Conduct mulching as specified in Section 32 90 00.

J. Seed for Erosion Control: as specified in Section 32 90 00.

K. Flow Exclusion: Turbidity curtains or similar exclusion barriers as noted on the Drawings shall be used to reduce turbidity associated with work occurring under active flow conditions. The Contractor shall monitor turbidity in accordance with the SESC Plan.

L. Install and maintain stabilized construction entrance(s) at ingress/egress points. The entrance(s) shall be maintained in a condition that will prevent tracking of sediment onto adjacent property or public rights-of-way. Any sediment tracked off site shall be removed to eliminate the offsite transport of sediment from the site and maintain public safety. All vehicular access areas to the site shall be
stabilized. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or waterways.

3.2 MAINTENANCE
A. The Contractor shall be held responsible for the implementation and maintenance of all erosion control measures on the Site.
B. Throughout construction and until the Site has been stabilized upon completion of the Work, all erosion and sediment control measures will require periodic inspection and maintenance by the Contractor to ensure that such measures are providing effective service. At a minimum, the following inspection and maintenance shall be required during execution of this project:
   1. All erosion and sediment control will be inspected at least once a week and after all significant rain events. Conduct required repairs to installed measures immediately to ensure continued effective operation.
   2. Remove sediment that has accumulated behind the sedimentation fencing when it has reached a depth of approximately 0.5 feet deep or removed as needed when bulges develop in the fence. The sedimentation fence shall be repaired as necessary to maintain the barrier as intended.
   3. Sediment removed from control measures shall be collected and segregated as material to be placed in on-site spoils area.
   4. All seeded areas will be protected from traffic and shall receive appropriate watering during germination and growth establishment. Areas that do not establish a vigorous, dense vegetative cover (at least 90% surface coverage) shall be reseeded and mulched as specified in Section 329000.
C. Maintain the integrity of all erosion control measures throughout construction period.

3.3 SPECIAL CONDITIONS
A. Prohibited Construction Practices - Prohibited construction practices include but shall not be limited to the following:
   1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, storm drain system, or at any other unspecified locations.
   2. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, any wetlands, or any surface waters.
   3. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors, any wetlands, or any storm drain system.
   4. Disposal of trees, brush and other debris in any stream corridors, any wetlands, any surface water or at unspecified locations, without approval of the Engineer.
   5. Permanent or unspecified alteration of the flow line of any stream.
   6. Open burning of construction debris.

3.4 ADJUSTMENT OF PRACTICES
A. If the planned measures do not result in effective control of erosion and sediment runoff to the satisfaction of the Engineer or regulatory agencies having jurisdiction over the project, the Contractor shall immediately adjust their program and/or institute additional measures or changes to work methods so as to eliminate excessive erosion and sediment runoff.
B. If the Contractor fails or refuses to comply promptly, the Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No
time lost due to any such stop orders shall be made the subject of a claim for extension of
time or for excess costs or damages by the Contractor.

3.5 REMOVAL OF TEMPORARY WORKS
A. Remove temporary erosion and sediment control measures only after disturbed areas
have been properly stabilized with vegetation. Remove temporary measures, level, and
grade to the extent required to present an attractive appearance and to prevent obstruction
of the flow of water or create detrimental concentrated water flow paths, or interfere with
the operation of or access to the permanent works.

3.6 DUST CONTROL
A. Contractor shall keep dust down at all times, including non-working hours.
B. The Contractor shall avoid practices or procedures that contribute to significant dust
production.
C. Contractor shall treat any soils, haul roads or other areas disturbed by operations with non
brine water, as deemed necessary by the Engineer.

END OF SECTION
SECTION 31 35 33

FABRIC ENCAPSULATED SOIL – BANK TREATMENT

PART 1 - GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Fabric Encapsulated Soil (FES): Fabric Encapsulated Soil is a combination of excavation and fill, nonwoven and woven coir fabric, construction forms, wooden stakes and cuttings arranged as shown on the Drawings.
   2. Fabric Encapsulated Lift – Bank Treatment is considered an ALLOWANCE Item as noted in Section 01 21 00 “Allowances”

1.2 QUALITY ASSURANCE
A. Reference Standards:
   1. ASTM International (ASTM):

1.3 RELATED WORK
A. Section 31 23 00 – Earthwork
B. Section 31 25 00 – Erosion and Sedimentation Controls
C. Section 32 90 00 – Planting
D. Section 01 21 00 – Allowances

1.4 SUBMITTALS
A. Manufacturer’s Technical Data and Samples:
   1. Prior to shipment of products to the Site, submit technical data (including material properties sheets) and samples of coir fabrics proposed for use in construction of fabric encapsulated soil for approval by the Engineer.
B. Quality Control Certifications:
   1. At time of shipment of products to the Site, submit manufacturers’ quality control certifications (including results of source quality control testing of the products as specified in subsection 2.1) to verify that the materials supplied for the project are in compliance with the product specifications in this Section.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Coir Fabrics:
   1. General: Coir fabrics shall consist of 100 percent biodegradable mats. Nylon fiber material in any of the coir fabrics is not acceptable.
      a. Each roll of coir fabric shall be packaged individually in a suitable sheet, wrapper, or container to protect the fabric from damage to ultraviolet light, moisture, and mud during normal storage and handling.
      b. Each roll of coir fabric shall be identified with a tag or label securely affixed to the outside of the roll on one end. The label shall include the manufacturer or supplier, the style number, and the roll and lot numbers.
c. Store all coir fabrics elevated off the ground and ensure that they are adequately covered to protect the material from damage. Protect coir fabrics from sharp objects which may damage the fabric. Coir fabrics damaged during transport, storage or placement shall be replaced at the Contractors expense.
d. The Engineer may randomly select and obtain samples from rolls of coir fabric after arrival on the site and prior to installation to compare to previously submitted samples.

a. The nonwoven coir fabric shall be North American Green (NAG) style C125BN 100 percent biodegradable coconut fiber mat or equal as reviewed and approved by the Engineer. The fabric shall be delivered in 5ft-10in roll widths and shall meet or exceed the following criteria:

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>ASTM D1777</td>
<td>0.251 inches</td>
</tr>
<tr>
<td>Dry Tensile Strength</td>
<td>ASTM D4632</td>
<td>20.7 lbs</td>
</tr>
<tr>
<td>Elongation</td>
<td>ASTM D4632</td>
<td>6.6%</td>
</tr>
<tr>
<td>Wet Tensile Strength</td>
<td>ASTM D4632</td>
<td>22.2 lbs</td>
</tr>
<tr>
<td>Elongation</td>
<td>ASTM D4632</td>
<td>14.1%</td>
</tr>
<tr>
<td>Weight</td>
<td>ASTM D3776</td>
<td>10.7 oz./yd</td>
</tr>
<tr>
<td>Open Area</td>
<td>Measured</td>
<td>7%</td>
</tr>
<tr>
<td>Roll Width</td>
<td>Measured</td>
<td>5 feet - 10 inches</td>
</tr>
<tr>
<td>Roll Length</td>
<td>Measured</td>
<td>90 feet</td>
</tr>
</tbody>
</table>

3. Woven Coir Fabric.
a. The woven coir fabric shall be a high strength, coir (100 percent coconut fiber), continuously woven mat (i.e., without seams) with the following minimum average roll properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>ASTM D1777</td>
<td>0.30 inches</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D4595</td>
<td>100 lb/in x 70 lb/in</td>
</tr>
<tr>
<td>Weight</td>
<td>ASTM D3776</td>
<td>20 oz./yd</td>
</tr>
<tr>
<td>Open Area</td>
<td>Measured</td>
<td>50%, maximum</td>
</tr>
<tr>
<td>Roll Width</td>
<td>Measured</td>
<td>12 ft</td>
</tr>
<tr>
<td>Roll Length</td>
<td>Measured</td>
<td>165 ft</td>
</tr>
</tbody>
</table>

b. The woven coir fabric (if without seams) shall be Bon Terra CF-7, DeKoWe 700, Nedia KoirMat 700, Rolanka BioDMat 70 or, approved equal.

B. Wood Stakes.
1. Wood Stakes shall be used to anchor all coir fabric edges and seams. Stakes shall be wooden stakes solid and free of knots or defects. Stakes shall be 24-inch length. Stakes shall be wedge shaped with a minimum equivalent diameter equal to 1.5 inch at the top and should come to a point at the bottom. Stakes should be constructed by cutting a standard grade 2-inch by 4-inch lumber lengthwise along the diagonal to create wedge shaped stakes, or by some other method resulting in a stake of dimensions reviewed and approved by the Engineer.

C. Wood Staples.
1. Wood staples shall be used to anchor coir fabrics. Staples shall be 12-inch length with a head to anchor fabric. North American Green Eco-Stake is pre-approved.

D. Soil Fill
1. Soil for use in fabric encapsulated soil lift installation will be native material salvaged and stockpiled by the Contractor from the site. If material consists entirely of sand, organic material shall be added to promote good vegetation growth. Soil fill shall contain adequate fine materials and organic matter, but be free of large roots, debris, trash or other deleterious substances, and have no particles greater than 3 inches in the maximum dimension. Soil fill material should be certified by the Engineer as suitable prior to installation of fabric encapsulated soil lifts as shown on the Drawings.

E. Cuttings
1. Cuttings shall consist of willow and dogwood species found on-site.

F. Seed Mix
1. Low Bottomland Mix – as specified in Section 32 90 00 Planting.

PART 3 - EXECUTION

3.1 Coir Fabric Installation
A. Coir fabric installation will occur in areas where coir fabrics are utilized as coverings over previously graded surfaces (fabric wrapped slope), and in areas where coir fabrics are utilized to wrap or encapsulate soil materials (fabric encapsulated soil lifts) in construction of streambanks, as shown on the drawings.

B. Fabric Wrapped Slope
   a. The area to be covered by the coir fabrics shall be graded to a smooth condition free from depressions and protruding rocks, sticks, and other debris which may prevent a smooth application or that may damage the fabric. Care shall be taken to remove all objects that would interfere with the application or damage the coir fabrics.
   b. Apply Seed Mix as shown on the Drawings to the graded surface prior to covering with coir fabrics. Stage installation to minimize disturbance of seeded areas during fabric installation.
   c. The coir fabrics shall be placed and anchored as shown on the Drawings using wood stakes. Wood stakes may be placed through both layers of coir fabrics. It is not required to anchor the nonwoven and woven fabrics individually. Wood stakes shall be placed between the fibers of the woven coir fabric. Cutting of the coir fabrics to facilitate wooden stake placement will not be allowed.
   d. Damaged coir fabric shall be repaired or replaced. If damaged coir fabric has a tear of 6 inches or less, scrap fabric may be placed beneath damaged woven coir fabric such that it extends 24 inches beyond the damaged area in all directions. Stake around the tear with four wooden stakes on 12-inch centers. Coir fabrics with tears greater than 6 inches shall be replaced at the Contractor’s expense.

C. Fabric Encapsulated Soil Lifts.
   a. Fabric encapsulated soil lifts are further divided into single fabric encapsulated soil lift and stacked fabric encapsulated soil lift installations.
         a) Perform all shaping of the subgrade to the elevations, lines and grades, as shown. Shape, trim, and finish
slopes of channels to conform to the subgrade lines, grades, and cross-sections as shown on the Drawings.

b) Roll non-woven coir fabric along the streambank and place fabric against the subgrade and (vertical) form face with embedment lengths as shown on the Drawings.

c) Remove all wrinkles in coir fabric and insure that fabrics rest tightly against the subgrade and form face with the proper embedment lengths. Allow excess coir fabric to drape over the form toward the stream channel.

d) Place approximately 6 inches of soil fill and compact to 85 percent of the material’s maximum dry density as determined using ASTM D1557.

e) Over the soil fill, place a 6-inch minimum layer of salvaged sedge root mat material and tamp to ensure solid contact with the underlying soils.

f) Pull coir fabrics that are draped over the form back over the placed sedge mat. Pull coir fabrics tight and stake according to the Drawings.

g) Remove forms. Note, forms can be removed by hand, or pried with a bar if necessary. Contractor shall not use equipment to remove forms.

h) Repeat a-g, above, to achieve the lines and grade shown on the Drawings.

i) Finished fabric encapsulated soil lifts shall have no loose coir fabric. Areas with loose coir fabric shall be staked with tapered wooden stakes to hold coir fabrics firm to underlying soil. If coir fabric folds are required around channel bends, the fold shall be in the direction of flow and coir fabric shall be staked at the folds.

2) Stacked fabric encapsulated soil lifts: Install stacked fabric wrapped soil lifts as shown on the Drawings and specified below.

a) Perform all shaping of the subgrade to the elevations, lines and grades, as shown. Shape, trim, and finish slopes of channels to conform to the subgrade lines, grades, and cross sections as shown.

b) Place cuttings horizontally on 2-foot centers beneath coir fabric wrapped lifts.

c) Place forms along the bank in locations to achieve the lines and grades shown on the Drawings.

d) Roll woven coir fabric along the streambank and place fabric against the subgrade and (vertical) form face with embedment lengths as shown on the Drawings.

e) Roll nonwoven coir fabric along the streambank and place on top of the woven coir fabric to achieve the embedment length shown on the Drawings.

f) Remove all wrinkles in coir fabric and insure that fabrics rest tightly against the subgrade and form face with the proper embedment lengths. Allow excess coir fabric to drape over the form toward the stream channel.
g) Apply Seed Mix as shown on the Drawings to that portion of nonwoven coir fabric that is placed against the vertical face of the form.

h) Place the appropriate soil thickness in a 1.0 to 1.5 feet lift and compact to 85 percent of the material’s maximum dry density as determined using ASTM D1557:

<table>
<thead>
<tr>
<th>Total Vertical Bank Height</th>
<th>Number of Fabric Wrapped Lifts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0’ to 1.5’</td>
<td>1</td>
</tr>
<tr>
<td>1.6’ to 3.0’</td>
<td>2</td>
</tr>
<tr>
<td>3.1’ to 4.5’</td>
<td>3</td>
</tr>
<tr>
<td>6.1’ to 7.5’</td>
<td>5</td>
</tr>
</tbody>
</table>

i) Apply Native Seed Mix as shown on the Drawings to the soil lift

j) Pull coir fabrics that are draped over the form back over seeded soil. Pull coir fabrics tight and stake according to the Drawings

k) Remove forms. Note, forms can be removed by hand, or pried with a bar if necessary. Contractor shall not use equipment to remove forms.

l) Repeat a-k, above, to achieve the lines and grade shown on the Drawings.

m) Finished fabric encapsulated soil lifts shall have no loose coir fabric. Areas with loose coir fabric shall be staked with tapered wooden stakes to hold coir fabrics firmly to underlying soil. If coir fabric folds are required around channel bends, the fold shall be in the direction of flow and coir fabric shall be staked at the folds.

END OF SECTION
SECTION 31 35 36

LARGE WOOD

PART 1 - GENERAL

1.1 SUMMARY
A. Section Includes: Large Wood Logs and Rootwads including cable.
B. Large Wood is considered an ALLOWANCE item to be exercised at the Owner’s discretion as noted in Section 01 21 00 “Allowances”. Large Wood will be used for habitat elements and/or as bank protection. Bank protection locations are noted on the Drawings. Habitat locations will be in the Upper Impoundment. Bank protection locations will be in the Lower Impoundment.
C. Some Large Wood has been located by the Owner within a 2 mile radius of the Brown Bridge Dam. An Allowance Bid item for transportation of this wood to the Upper Impoundment and staging near the channel is included. In addition, furnishing, transporting and installing Large Wood solely by the contractor is an additional Allowance Bid item.
D. Large Wood may be installed following completion of excavation activities.

1.2 QUALITY ASSURANCE
A. Reference Standards:

1.3 RELATED WORK
A. Section 31 23 00 – Earthwork
B. Section 31 25 00 – Erosion and Sedimentation Controls
C. Section 01 21 00 – Allowances

1.4 SUBMITTALS
A. Large Wood
   1. Submit source, quantity, size and tree species to be used for Large Wood, Logs to the Engineer for approval.
   2. Submit source, quantity, size and tree species to be used for Large Wood, Rootwads to the Engineer for approval.
B. Cable
   1. Submit technical data for cable, and cable clamps proposed for use securing Large Wood to the Engineer for approval.
C. Tension Scale
   1. Submit tension scale make and model to the Engineer for approval.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Large Wood:
   1. Logs:
      a. Large Wood, Logs shall be Cedar, White Pine or approved equivalent. Species availability is expected to vary.
b. Trunk diameter (DBH) of Large Wood, Logs will range from 12 to 30 inches. Trunk lengths will range from 20 to 35 feet. An even mixture of sizes within this range is expected. Large Wood, Logs shall be trimmed of branches less than 6 inches diameter beyond the maximum length.

c. Large Wood for use as Piles or Buried Logs (Deadman) Shall be minimum 18 inch diameter and of lengths shown on the Drawings

d. Large Wood, Logs shall be free from rot or decay.

e. Care should be taken when handling Large Wood, Logs materials to minimize damage such as abrasion, splitting, crushing and shearing to the tree trunk.

2. Rootwads:
   a. Large Wood, Rootwads shall be Cedar, White Pine or approved equivalent. Species availability is expected to vary. An even mixture of sizes within this range is expected.
   b. Large Wood, Rootwads will consist of rot resistant logs.
   c. Trunk diameter of Large Wood, Rootwads will range from 12 to 30 inches. Trunk lengths will range from 20 to 35 feet. Large Wood, Rootwads shall be trimmed of branches less than 6 inches diameter beyond the maximum length.
   d. Large Wood, Rootwads shall have a root fan diameter greater than 3 feet and shall remain intact.
   e. Large Wood, Rootwads shall be free from rot or decay.
   f. Care should be taken when handling Large Wood, Rootwads materials to minimize damage such as abrasion, splitting, crushing and shearing to the tree trunk and roots.

3. 3/8-Inch Cable:
   a. 3/8-Inch Cable shall be galvanized, steel core, 3/8-inch diameter and shall have a minimum nominal tensile capacity of 12 tons.

4. Cable Clamps
   a. Cable clamps shall be galvanized steel and shall meet the performance requirements of Federal Specification FF-C-450 TYPE 1 CLASS 1. Cable clamps shall be Crosby Clips, “G-450” or approved equal.

5. Tension Scale
   a. Tension scale shall be Intercomp TL 6000 tension scale or approved equal capable of 25000 LBS rating.

PART 3 - EXECUTION

3.1 INSTALLATION
   A. Large Wood Installation
      1. Excavate as necessary to place Large Wood while minimizing disturbance to existing grade. Shape, trim, and finish existing grade to allow for placement of Large Wood as shown on the Drawings.
      2. Test Piles or Buried Wood for load as noted in the Drawings and described here
         a. Rigging for Scale should utilize ½-inch galvanized steel wire and conform to manufacturers recommendations.
         b. It should be expected that up to 25 percent of the Piles or Buried Logs will be tested.
         c. Testing should be performed in the presence of the Engineer and the load recorded.
         d. The Proof Load tests should be made by incrementally loading the Pile or Buried Log in accordance with the table on the Drawings.
3. Place Large Wood where required in final configuration after consultation with and approval of Engineer.

4. Large Wood cabled to Large Wood and Large Wood cabled to Buried Large Wood or Pile.
   a. Large Wood shall be cabled to Large Wood and Large Wood cabled to Pile as shown on the Drawings and as directed by the Engineer.
   b. Cables shall be wrapped as shown on the Drawings and pulled tight as cable clamp fasteners are tightened.

5. Cable clamps shall be installed in accordance with the manufacturer’s recommendations. The saddle of cable clamps shall be positioned on the line with live load. If both ends of cable are live loads, use multiple clamps and alternate saddle positions. Tension cables to remove slack and install cable clamps on tensioned cables.

END OF SECTION
SECTION 31 50 00
EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY
A. Furnish and install an engineered shoring system where shown on the Drawings and where required to meet safety requirements of the U.S. Department of Labor's Construction Safety Act designated as Title 29-LABOR-Part 1926 Safety and Health Regulations for Construction, Subpart P, Sections 926.650 through 653 or other relevant regulations or codes.
B. Excavations in public streets, private roadways, and other confined areas where excavation sidewalls cannot be sloped, and damage to property and/or injury to workers could occur, must be supported by an engineered shorting system (shoring, sheeting, bracing, and/or other methods such as use of trench box systems).
C. Furnish and install a temporary dewatering structure immediately upstream of the Brown Bridge Dam as shown on the Drawings and as specified in Section 31 23 19. Shoring system shall control the water level and flow during the demolition of the existing dam powerhouse structure.
D. Should an alternative temporary dewatering structure be proposed by the Contractor from that shown, and approved by the Engineer, the planning, design, installation, operation and monitoring of engineered dewatering structure shall be completed by a structural/geotechnical engineer registered in the State of Michigan.
E. The steel sheeting system shall include an H-pile slot/stoplog gate as shown on the Drawings. The slot gate shall be operated to control the elevation of the river which shall be lowered at a rate of 6-inches per day or as directed by the Engineer.

1.2 RELATED WORK SPECIFIED ELSEWHERE
A. Section 01 3 30: Submittal Procedures.
B. Section 02 41 00: Demolition.
C. Section 31 23 19: Dewatering.
D. Section 31 23 00: Earthwork.

1.3 QUALITY ASSURANCE
A. The consequences of an excavation failure or protection of the protection of adjacent structures that must remain require the use of an engineered shoring system to safely support excavations during demolition and grading activities.
B. Where an engineered sheeting system is required by the Engineer to facilitate the demolition of the powerhouse superstructure, portions of the embankment dam, and control river flow, due to changed or unforeseen conditions, and/or necessary to meet safety requirements, beyond that shown on the Drawings, the Contractor shall have a registered professional engineer complete the design. In addition to design of lateral support, the following points must be addressed in the design(s):
   1. Lateral stability against river flow, blow-in or bottom heave;
   2. Stability of the riverbank during excavation;
   3. Stability and support of adjacent structures; and/or
   4. Control of river elevation.
1.4 SUBMITTALS
A. The following shall be submitted to the Engineer for approval in accordance with Section 01 33 00 at least 10 days prior to installation of sheeting where indicated on the Drawings, where required by the Engineer due to changed or unforeseen conditions, and where required to meet safety requirements:
   1. An alternative temporary dewatering structure proposed by the Contractor or engineered shoring system design for other purposes, sealed by a registered Michigan Professional Engineer.
   2. Product/material information, data, and/or specifications.
   3. Means and methods for vibration monitoring should driven sheeting be used at any adjacent structure.
   4. Safety plan submittal for the additional work if not covered by previous submittal.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Keep moisture-sensitive materials dry during delivery and storage. Protect against exposure to weather and contact with damp or wet surfaces. Stack sheeting, steel members, lumber and plywood, and provide air circulation within stacks.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Trench Box, as necessary, best adapted to site-specific design requirements.
B. Wood Sheeting and Stop Logs:
   1. Stop Logs: Construction grade lumber.
   2. Lumber and Timber used for Wood Sheeting and Bracing if proposed for use on the site: Construction grade lumber.
C. Steel Sheeting: Interlocking type with section best adapted to design requirements, as shown on the Drawings.
D. Bracing/Walers, as necessary, best adapted to site-specific design requirements, as shown on the Drawings.
E. Anchors, as necessary, best adapted to site-specific design requirements.

PART 3 - EXECUTION

3.1 SHEETING INSTALLATION
A. Driving of Sheetig:
   1. Install sheeting and bracing in accordance with accepted practices and in compliance with State and Federal safety requirements.
   2. Furnish skilled and experienced workers with adequate equipment to produce a safe structure.
   3. Drive sheeting prior to excavation and powerhouse demolition.
B. Withdrawal of Sheetig:
   1. Remove sheeting as the work progresses in a manner to prevent damage to finished work or adjacent structures and property.
C. Sheetig Left in Place:
   1. Sheetig shall only be left in place where shown on the Drawings or where...
approved by the Engineer.

2. Sheeting shall be cut 4 feet below finished surface grade and/or river bottom as approved by the Engineer.

END OF SECTION
DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 90 00

PLANTING

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes the furnishing of all labor, equipment, and material to complete proper seeding for the Brown Bridge Dam Removal and Restoration project.
B. Seeding, hydro-seeding, composting, and mulching will be measured by the acre seeded to the nearest one-tenth of an acre.
C. Contractor should comply with the Invasive Species Management Plan for the Boardman River (AMEC, 2011). The objectives of this document should be reviewed with all contractor staff prior to initiation of work activities.
D. This planting specification has been prepared in coordination with the Draft Tribal Traditional Ecological Knowledge Relative to the Boardman River Watershed (Andrews Cultural Resources, 2011) and the Little Traverse Bay Bands of Odawa Indians Native Plants Initiative (Pilette, 2009).

1.2 RELATED WORK
A. Section 31 23 00 – Earthwork
B. Section 31 25 00 – Erosion and Sedimentation Controls

1.3 REFERENCES

1.4 DEFINITIONS
A. Native Species. Native species are plants that are indigenous to Grand Traverse County, Michigan and are well adapted to the local habitat and climate. Native species selected for permanent vegetation are chosen based upon plants that would naturally occur in the restoration communities. Seed for restoration and seed used to produce plants for restoration will be harvested directly from wild, native stands or will be seed that was originally collected from native stands and put into production. All plant material (i.e., seed, plugs, rootstock, container-grown, etc.) used for permanent vegetation will have its source of origin within 250 miles of the restoration site.
B. Noxious Weeds. Noxious weeds are any plant recognized by the State of Michigan in the Michigan Seed Law (Act 329 of 1965) as prohibited or restricted noxious weeds. Seeds of prohibited noxious weeds are prohibited as contaminants in seed offered for sale. Prohibited noxious weeds include:
   - Agropyron repens (aka Elytrigia repens) – quackgrass
   - Ambrosia elatior – ragweed
   - Berteora incana - hoary alyssum
   - Brassica spp – mustards
   - Cardaria draba – whitetop, hoary cress or perennial peppergrass
   - Carduus acanthoides - plumeless thistle
   - Carduus nutans - musk thistle
- Centaurea maculosa - spotted knapweed
- Centaurea pincetis - Russian knapweed
- Cirsium arvense - bull thistle
- Cirsium vulgare - Canada thistle
- Convolvulus arvensis - field bindweed
- Convolvulus sepium - hedge bindweed
- Cuscuta spp – dodder
- Cynperm esculentus, both seed and tubers - yellow nutsedge, chufa
- Euphorbia esula - leafy spurge
- Ipomea spp - morning glory
- Nasella trachoma - serrated tussock
- Rhus toxicodendron - poison ivy
- Solanum carolinense – horesnettles
- Sonchus arvensis - perennial sowthistle
- Sorghum halapense – Johnsongrass
- Toxicodendron vernix - poison sumac
- Tribulus terrestris - puncturevine

Seeds of restricted noxious weeds are restricted as contaminants in seed offered for sale with a general limit of one seed per 2,000 seeds offered for sale. Restricted noxious weeds include:

- Abutilon theophrasti - Velvetleaf
- Allium canadense - Wild onion
- Allium vineale - Wild garlic
- Avena fatua - Wild oat
- Barbarea vulgaris - Yellow rocket
- Berteroa incana - Hoary alyssum
- Brassica juncea - Indian mustard
- Brassica nigra - Black mustard
- Datura stramonium – Jimsonweed
- Daucus carota - Wild carrot
- Plantago lanceolata - Buckhorn plaintain
- Raphanus raphanistrum - Wild radish
- Rumex crispus - Curled dock
- Setaria faberii - Giant foxtail
- Sinapis arvensis – Charlock
- Solanum spp - Nightshade complex
- Thalassia arvense – Fanweed
- Xanthium strumarium - Cocklebur

C. Pure Live Seed (PLS). Pure live seed is the viable/sproutable seed of particular species. Therefore, when ordering one PLS pound of a given species, more than one bulk pound may be delivered to make up for any inert material (stems, hulls or seed that won’t germinate). Pure Live Seed is defined by the formula:

\[
PLS = \frac{(\text{Percent Purity of the Seed} \times \text{Germination Percentage})}{100}
\]

1.5 SUBMITTALS
A. Grower’s Certification: A report from the grower indicating native plant species supplied and location of genetic origin (county and state of source material) for each native species
supplied. Grower’s certification shall be submitted to the Engineer at least ten (10) calendar days prior to initiation of seeding activities.

B. Seed Test: Test report for all seed to be used on the restoration site shall be submitted to the Engineer at least ten (10) calendar days prior to initiation of seeding activities. Seed tests shall be less than nine (9) months old and shall indicate the Lot Number that can be traced to seed bag labels delivered to the restoration site. Seed test reports shall indicate purity, germination, and noxious weed seed content, and shall meet the PLS requirements as prescribed herein.

C. Fertilizer analysis: A certificate of analysis for all fertilizer used on the restoration site shall be submitted to the Engineer at least ten (10) calendar days prior to use.

1.6 QUALITY ASSURANCE
A. Field Supervision: Contractor shall maintain an experienced full-time field supervisor on the restoration site when work is in progress. Field supervisor shall be experienced in natural area restoration and shall have at least 5 years of successful experience in planting native grass and forb seed using hydro-seeding, native seed drill, and traditional broadcast methods.

B. Unless specified otherwise, seed should not contain in excess of one (1) percent of weed seed; zero (0) percent is desirable. Sampling and testing of the seed and seed tag labeling requirements shall be done in accordance with the seed regulations for the state of Michigan (Michigan Seed Law, Act 329 of 1965, as amended) and with the Rules for Testing Seeds adopted by the Association of Official Seed Analysts (2010).

C. Substitutions: If specified seed or products are not commercially available, submit to Engineer a proposal for use of an equivalent product.

D. Soil Analysis: The Owner shall provide soil sampling and macronutrient analysis by a qualified soil-testing laboratory. Based on these results, the Owner shall prescribe composition and rates of fertilizer to be applied during seedbed prep by the Contractor. Separate fertilizer specifications will be provided for the Low Bottomland and High Bottomland areas. Fertilizer will not be required in areas where compost is applied on the Slope Stabilization Areas (SSA).

E. Kickoff Meeting: Prior to initiating work in the field, Contractor shall host a field meeting with the Engineer at the restoration site to review required submittals and reports and to discuss methods and sequence of work.

1.7 DELIVERY, STORAGE, AND HANDLING
A. During all operations, seed and seed bags will be kept covered, dry, shaded and out of direct sunlight. Seeds will not be stored in locations or vehicles where the temperature will be in excess of 90°F.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL
A. Nurse Crop
1. Nurse crops are temporary crops consisting of an annual, non-competitive crop sown with the permanent vegetation. The nurse crop provides erosion control and reduces the risk of invasive weeds until the permanent vegetation becomes established. Nurse crop will consist of one of the following species depending on the site conditions and the time of seeding as provide in Table 1.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Nurse Crop</th>
</tr>
</thead>
</table>

329000 - Planting
05/10/12 329000-3 Final Design – Bid Issue
### Botanical Name | Common Name | Bulk lbs/acre
---|---|---
*Avena sativa* | Spring oats | 60<sup>1</sup>
*Lolium multiflorum* | Annual rye | 25<sup>2</sup>

<sup>1</sup> Spring and Early Summer Seeding  
<sup>2</sup> Late Summer and Fall Seeding

#### B. Native Seed

1. Native seed will be supplied on the basis of PLS. The seed will be from the most recent harvest [one (1) year old or less]. These seeds will be supplied as single species, partial seed mixes, or full seed mixes in separate bags. Seed mixes will be as specified in Tables 2, 3, and 4, based on commercial availability, with minimum PLS percentage for each of the various groupings. The seed will contain no prohibited noxious weeds.

2. All native seed will be cleaned/threshed/screened to remove the fruiting bracts, scales, floral parts, awns, perigynia, and other non-seed debris to the maximum practicable extent. Seeds will be fresh, free of deleterious material and disease, and delivered to the site in the original, unopened bags showing a certified net weight, date of testing, supplier’s name, and certified guarantee of analysis including the composition, PLS information, and percent weed seed. Seed will be kept dry and unopened until needed for use. Damaged or faulty packages will not be used.

3. All native seed used for permanent vegetation will have its source of genetic origin within 250 miles of the restoration site.

#### Table 2  Low Bottomland Mix (8 PLS lbs/acre x approximately 74 acres)

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Indicator</th>
<th>Percentage of Mix (by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Andropogon gerardii</em></td>
<td>Big bluestem</td>
<td>FAC-</td>
<td>20</td>
</tr>
<tr>
<td><em>Carex hystericina</em></td>
<td>Porcupine sedge</td>
<td>OBL</td>
<td>5</td>
</tr>
<tr>
<td><em>Carex vulpinoidea</em></td>
<td>Fox sedge</td>
<td>OBL</td>
<td>4</td>
</tr>
<tr>
<td><em>Elymus virginicus</em></td>
<td>Virginia wild rye</td>
<td>FACW-</td>
<td>30</td>
</tr>
<tr>
<td><em>Glyceria striata</em></td>
<td>Fowl mana grass</td>
<td>OBL</td>
<td>3</td>
</tr>
<tr>
<td><em>Leersia oryzoides</em></td>
<td>Rice cut grass</td>
<td>OBL</td>
<td>15</td>
</tr>
<tr>
<td><em>Panicum virgatum</em></td>
<td>Switch grass</td>
<td>FAC+</td>
<td>15</td>
</tr>
<tr>
<td><em>Scirpus atrovirens</em></td>
<td>Dark green rush</td>
<td>OBL</td>
<td>2</td>
</tr>
<tr>
<td><em>Scirpus cyperinus</em></td>
<td>Wool grass</td>
<td>OBL</td>
<td>1</td>
</tr>
<tr>
<td><em>Scirpus validus</em></td>
<td>Great bulrush</td>
<td>OBL</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

#### Table 3  High Bottomland Mix (12 PLS lbs/acre x approximately 84 acres)

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Indicator</th>
<th>Percentage of Mix (by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Andropogon gerardii</em></td>
<td>Big bluestem</td>
<td>FAC-</td>
<td>30</td>
</tr>
<tr>
<td><em>Carex vulpinoidea</em></td>
<td>Fox sedge</td>
<td>OBL</td>
<td>4</td>
</tr>
</tbody>
</table>

### Table 4  Upland Slope Stabilization Mix (15 PLS lbs/acre x approximately 5 acres)

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Indicator</th>
<th>Percentage of Mix (by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Andropogon gerardii</em></td>
<td>Big bluestem</td>
<td>FAC-</td>
<td>20</td>
</tr>
<tr>
<td><em>Coreopsis lanceolata</em></td>
<td>Coreopsis</td>
<td>FACU</td>
<td>8</td>
</tr>
<tr>
<td><em>Elymus canadensis</em></td>
<td>Canada wild rye</td>
<td>FAC-</td>
<td>25</td>
</tr>
<tr>
<td><em>Panicum virgatum</em></td>
<td>Switch grass</td>
<td>FAC+</td>
<td>10</td>
</tr>
<tr>
<td><em>Rudbeckia hirta</em></td>
<td>Black-eyed Susan</td>
<td>FACU</td>
<td>3</td>
</tr>
<tr>
<td><em>Schizachyrium scoparium</em></td>
<td>Little bluestem</td>
<td>FACU</td>
<td>20</td>
</tr>
<tr>
<td><em>Sorghastrum nutans</em></td>
<td>Indian grass</td>
<td>FACU+</td>
<td>10</td>
</tr>
<tr>
<td><em>Sporobolus cryptandrus</em></td>
<td>Sand dropseed</td>
<td>FACU-</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

#### 2.2 AMENDMENTS

**A. Compost:** Compost shall be aged, decomposed organic material derived from agricultural residues, food residues, biosolids (treated sewage sludge), yard waste, or tree trimmings with a maximum particle size of 0.75 inches and a pH within a range of 5.5 to 7.5. Compost shall not contain substances known to be toxic to plants. Compost shall be approved by the Engineer and will be supplied by the City of Traverse City. Compost will be loaded on to trucks by the City of Traverse City, but must be hauled to the job site by the Contractor. City supplied compost is located at:

2571 Keystone Ave, Traverse City, Michigan 49686

**B. Fertilizer:** Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen. For the Low and High Bottomland areas, fertilizer rates are to be based on the results of the soil analysis provided by the Owner. Fertilizer will not be required on areas amended with compost such as the Slope Stabilization Area (SSA).

**C. Wood Slurry Mulch (Hydro Mulch)**

1. Hydro mulch shall be fiber-processed from whole wood chips manufactured specifically for standard hydraulic mulching equipment. Fiber shall not be produced from recycled material such as sawdust, paper, or cardboard.

2. Moisture content shall not exceed 10 percent, plus or minus 3 percent, as defined by the pulp and paper industry standards. Fiber shall have a water holding capacity of not less than 900 grams of water per 100 grams fiber.
3. Hydro mulch shall disperse into a uniform slurry when mixed with water and shall be nontoxic to plant life or animal life.
4. Hydro mulch shall contain a non-petroleum based tackifier and a green dye for visual monitoring during application, and shall not harm germination or plant growth.

PART 3 - EXECUTION

3.1 SEEDING – LOW BOTTOMLAND
A. Low Bottomland consists of areas below the historic pool of Brown Bridge Pond outside of the new river channel as shown in the Landscape Planting Plan. Low Bottomland includes the actively excavated riparian zone floodplain measured as 20-feet out from the top of bank on either side of the new river channel.
B. Stake out Low Bottomland in the field and field verify with Engineer. Stake out may be based on sub-meter accuracy GPS navigation in the field using shape files provided by the Engineer. Contractor shall provide surveyed quantities (acres) of the Low Bottomland to the Engineer prior to seeding.
C. Immediately prior to seedbed preparation, Contractor shall broadcast fertilizer within Low Bottomland in accordance with recommendations from the soil as directed by the Engineer. Fertilizer should not be placed within 100 feet of the river channel. Fertilizer shall be incorporated into the soil as described below in seedbed preparation.
D. Seedbed shall be prepared using a spike-tooth harrow with finishing pulverizer in areas where soils are not compacted. Compacted layers shall be disked in the top 6 inches of the soil profile and then firmed and smoothed using a roller harrow, culti-packer, or similar implement to firm and remove large clods. The final prepared seedbed shall not contain soil clods greater than 2 inches in diameter.
E. Contractor shall seed in accordance with Table 2 (Low Bottomland Mix) and using appropriate nurse crop in Table 1. Seeding shall occur within 24 hours of seedbed preparation and shall be performed using traditional broadcast methods (followed by harrowing) or using a culti-packer to achieve seed-to-soil contact. Native seed shall never be planted more than ¼ inch deep.
F. Areas not accessible using the methods above may be hand broadcasted or hydro-seeded.
G. If hydro-seeding, Contractor shall mix all nurse crop (Table 1), native seed (Table 2, Low Bottomland Mix), and fertilizer together with hydro-mulch in hydro-seeder tank and spray apply together in accordance with manufacturer recommendations. Hydro-seeding shall occur such that the entire mixture is evenly distributed across the entire Low Bottomland without bare spots. Wood slurry mulch (hydro-mulch) to be applied at a rate of 1500 lbs/acre. Fertilizer shall not be applied within 100 feet of the new river channel.
H. Low Bottomland seeding shall occur between April 1st and December 1st.

3.2 SEEDING – HIGH BOTTOMLAND
A. High Bottomland consists of areas below the historic pool of Brown Bridge Pond outside of the new river channel and outside of the Low Bottomland as shown on the Landscape Planting Plan. High Bottomland does not include the actively excavated riparian zone floodplain on either side of the new river channel.
B. Stake out High Bottomland in the field and field verify with Engineer. Stake out may be based on sub-meter accuracy GPS navigation in the field using shape files provided by the Engineer. Contractor shall provide surveyed quantities (acres) of the High Bottomland to the Engineer prior to seeding.
C. Immediately prior to seedbed preparation, Contractor shall broadcast fertilizer within High Bottomland in accordance with recommendations from the soil test and based on input from the Engineer. Fertilizer should not be placed within 100 feet of the river channel. Fertilizer shall be incorporated into the soil as described below in seedbed preparation.

D. Seedbed shall be prepared using a spike-tooth harrow with finishing pulverizer in areas where soils are not compacted. Compacted layers shall be disked in the top 6 inches of the soil profile and then firm and smoothed using a roller harrow, culti-packer, or similar implement to firm and remove large clods. The final prepared seedbed shall not contain soil clods greater than 2 inches in diameter.

E. Contractor shall seed in accordance with Table 3 (High Bottomland Mix) and using appropriate nurse crop in Table 1. Seeding shall occur within 24 hours of seedbed preparation and shall be performed using traditional broadcast methods (followed by harrowing) or using a culti-packer to achieve seed-to-soil contact. Native seed shall never be planted more than ¼ inch deep.

F. Areas not accessible using the methods above may be hand broadcasted or hydro-seeded.

G. If hydro-seeding, Contractor shall mix all nurse crop (Table 1), native seed (Table 3, High Bottomland Mix), and fertilizer together with hydro-mulch in hydro-seeder tank and spray apply together in accordance with manufacturer recommendations. Hydro-seeding shall occur such that the entire mixture is evenly distributed across the entire High Bottomland without bare spots. Wood slurry mulch (hydro-mulch) to be applied at a rate of 1500 lbs/acre. Fertilizer shall not be applied within 100 feet of the new river channel.

H. High Bottomland seeding shall occur between April 1st and December 1st.

3.3 SEEDING – SLOPE STABILIZATION AREA (SSA)

A. Stake out the SSA in the field and field verify with Engineer. Contractor shall provide surveyed quantities (acres) of the SSA to the Engineer prior to seeding.

B. Mechanical seedbed preparation is not required for SSA, however, Contractor shall hand rake areas with deep ruts (4 inches or deeper) to provide a smooth uniform seedbed prior to application of compost.

C. Apply aged compost to the surface of the SSA to achieve complete coverage (no bare spots) to a minimum depth of four (4) inches. Application of compost to SSA shall be accomplished with mechanical blowers or by using long-reach excavators. Contractor shall not drive on SSA either before or after compost application and shall restrict foot traffic to minimize disturbance of the sandy slopes.

D. Contractor shall broadcast nurse crop (Table 1) and native seed (Table 4, Upland Slope Stabilization Mix) onto SSA, on top of compost layer, using manual walk-behind broadcaster or hand broadcasting methods. Seeding shall occur such that the entire mixture is evenly distributed across the entire SSA without bare spots.

E. If SSA is inaccessible, Contractor may hydro-seed steep slopes after compost application. Hydro-seeding shall be accomplished using a wood slurry mulch (hydro mulch) mixed with nurse crop (Table 1) and native seed (Table 4) providing complete coverage at a rate of 2000 lbs/acre on the SSA.

F. SSA seeding shall occur between April 1st and August 30th.

END OF SECTION
LIST OF DRAWINGS
LIST OF DRAWINGS

The Contract Drawings (hereinafter “Drawings”), included as separately bound documents, are considered part of the proposed Contract Documents for the Work as identified in the Agreement.


<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Latest Revision Date</th>
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<tr>
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<td>Cover Sheet</td>
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<tr>
<td>G-002</td>
<td>05/10/12</td>
<td>General Notes, Legend and Abbreviations</td>
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<td>C-101</td>
<td>05/10/12</td>
<td>Brown Bridge Dam – Project Site Plan</td>
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<td>C-102</td>
<td>05/10/12</td>
<td>Brown Bridge Dam and Lower Impoundment Existing Conditions Plan</td>
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ATTACHMENT A

BROWN BRIDGE DAM RECORD DRAWINGS
ATTACHMENT B

HISTORIC BORING AND TEST PIT RECORDS
LETTER OF TRANSMITTAL

DATE: 4-19-85
JOE NO.: T3-85A

TO: Gosling Czubak Associates - PC
525 W 14th
Traverse City, MI 49684

(608) 233-9706

ATTENTION: Mr. Chuck Brumbaugh

RE: Brown Bridge Exploration

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via ____________________________the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐

<table>
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<th>DESCRIPTION</th>
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<td>SPT procedures for seismic studies</td>
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<td></td>
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<td>(in addition to ASTM D 1586-67)</td>
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| THESE ARE TRANSMITTED as checked below: |
| ☐ For approval |
| ☑ For your use |
| ☐ As requested |
| ☐ For review and comment |
| ☐ FOR BIDS DUE ____________________ 19 ☐ PRINTS RETURNED AFTER LOAN TO US |

REMARKS:

Chuck: this should help to explain our SPT procedures. If you have any questions please call me (or Terry Hampton) by Wed. April 24 if possible.

Thank you

Tom Fontaine

COPY TO ____________________________

SIGNED: ____________________________

If enclosures are not as noted, kindly notify us at once.
APPENDIX B

STANDARD PENETRATION TEST
FOR SEISMIC STABILITY STUDIES

The equipment and procedures used for the standard penetration test should be in general conformance with ASTM Designation D 1586-67, "Standard Method for Penetration Test and Split-Barrel Sampling of Soils"[1]. The additional specifications below, with the exception of the method of recording penetration in gravelly materials, are in conformance with the standard as it has generally been construed. The variations in practice permitted by the standard method have been shown to lead to unacceptably large variability in the results. The procedures specified below are intended to (1) improve the repeatability and comparability of the results, and (2) provide results that are comparable to the bulk of the historical data, which are the empirical basis for evaluating liquefaction potential by the SPT. It must be emphasized that special care and attention to detail are needed to obtain results of the quality and reliability needed in seismic stability studies. All relevant details of the procedure should be clearly shown on the driller's log.

Rods. The type of rods used should be recorded on the log. Because correction to the blow count is required for short rod lengths, the length of rod should be recorded for each drive where the rod length is less than 20 feet.

Drive Weight Assembly. A rope and drum (cathead) system should be used, with two turns of the rope around the drum. The rope should be replaced before it becomes worn or polished.

Drilling Mud. Drilling mud should be used to support the hole and to prevent heave of the bottom of the hole. The mud column must be above the level needed to balance any artesian pressures that may be encountered.

Hole Diameter. To provide lateral support for the drill rods, the hole should be kept to a diameter of about 4 inches. Where casing is used, it should be of 4-inch diameter.

Interval Tested. To minimize disturbance, the hole should be cleaned out to a depth of about one foot below the previous drive. This permits one test in each two and one half foot interval.
Gravelly Sands. In granular soils containing occasional pieces of gravel, the method of recording should be modified. The modified procedure is as follows:

1. Measure and record, to the nearest 1/4 inch, the cumulative penetration after each blow.

2. If the penetration per blow is less than about 1/2 inch, the measurement may be made after every other blow, or less frequently, so long as at least one measurement is recorded for each inch of penetration. For each measurement, record the cumulative number of blows and the cumulative penetration.

The results should be presented on a plot of cumulative penetration versus cumulative blow count. Using the slope of this curve, an estimate can frequently be made of what the blow count would have been without the influence of gravel.
May 23, 1985

Mr. Tom Fontaine
Mead & Hunt, Inc.
2350 University Avenue
P.O. Box 5247
Madison, WI 53705

Dear Tom:

Here are the only water well logs I could find near Brown Bridge.

Sincerely,

GOSLING CZUBAK ASSOCIATES, P.C.

Charles D. Brumbaugh
Manager of Geotechnical
and Testing Services

CDB:nn
Brown Bridge Dam is a hydraulic fill dam constructed in 1921 for the Traverse City Light and Power Department to generate hydroelectric power. The dam consists of two earth embankments separated by the powerhouse-spillway structure. The design and construction details of the earth embankments are not available to fully establish the foundation soils and the type of soils used within the earth embankment. From the available information, the soils of the embankment appear to consist mainly of sand and gravel. The foundation soils are of glacial origin and mainly outwash deposits of sand and gravel, perhaps interbedded with clays. The depth of overburden is relatively great (125 feet or more).

The major considerations involved in an analysis of threats to dam safety caused by earthquake-induced ground motions are: (1) potential for flow slides resulting from liquefaction of embankment or foundation materials and (2) permanent deformations if embankment materials do not lose appreciable strength during an earthquake, i.e., where liquefaction is not a problem. Cost of investigation can be minimized by phased investigation, and this approach is proposed in this plan. The evaluation will start with the simplified methods and progress, as necessary, to more sophisticated and expensive. The evaluation will be terminated when definitive answers are obtained. Early in the study, it will be decided whether embankment and foundation soils are of types that could be susceptible to liquefaction under earthquake loadings up to and including the maximum credible earthquake for the site of the dam. The outcome of this decision will determine not only the methods of analysis to be used but the kinds and amount of field investigation needed. With this phased approach in mind, the following investigation is planned as a minimum which will be supplanted as necessary:

1. **Geological and Seismological Study.** An acceleration-time history has to be developed for maximum credible earthquake and used in the analysis. This phase will run concurrently with the field exploration. The seismic
setting of the dam will be determined by relating distance from causative faults and maximum credible earthquake magnitude. The site-specific study will identify earthquake source areas and/or fault structures, maximum credible earthquakes, and estimates of the magnitude-recurrence interval relationships for them. Based on this study, appropriate earthquake accelerograms for the earthquakes provided will be selected. The accelerograms may be derived from scaling existing records or, in some cases, from synthetic records that produce a specific response spectrum. Assistance will be sought from seismologists familiar with the geology and seismology of the region in which the dam site is located.

2. Field Investigation. The purpose of the initial field investigation is twofold: (i) to establish the dam geometry, i.e., crest alignment, concrete core wall location, location of the powerhouse and other structures, location of any drainage structures or ditches, and determination of a typical dike cross-section and (ii) to determine the nature and extent of the materials present in the embankment and the foundation to permit an assessment of the potential for liquefaction. Initially, three soil borings will be taken, one on each dike and one downstream from the embankment. Based on an understanding of the regional geology at the dam site and the conditions encountered in the borings, a subsurface model will be developed. If there are uncertainties about this model that may have an impact on the evaluation of the stability of the dam and its foundation, the exploration program will be expanded to reduce or eliminate those uncertainties.

The subsurface exploration in the bore holes will be carried using conventional methods. Standard penetration tests (SPT) will be performed at 5-foot intervals using drilling mud to support the sides of the bore hole. The tests will be performed with care and in conformity with the ASTM Standard D 1586-67. To provide results that are comparable to the bulk of the historical data, certain procedures and equipment will be specified, i.e., rod type, drive weight assembly, hole diameter, test interval, etc. The depth of exploration will extend sufficient distance into natural ground beneath the
dike for the bore holes on the embankments. The third bore hole downstream from the embankment will be used primarily to explore the foundation materials. When nongranular materials are encountered, "undisturbed" 3-inch thin-wall tube samples will be taken.

The samples recovered from the bore holes will be tested in the laboratory for grain size distribution, plasticity (certain clayey materials may be vulnerable to severe loss of strength as a result of earthquake shaking), density and static strength.

Four piezometers will be installed, two in each earth dike. On each cross-section to be monitored, one piezometer shall be located at approximately mid-height of the slope with the well-point head at least 10 feet deep and at least 2 feet below the phreatic surface. The other piezometer shall be located approximately 5 feet (vertical) above the toe of the dike with the well-point head at least 7 feet deep and at least 2 feet below the phreatic surface.

If the liquefaction or excessive deformation appears to be possible and if the subsurface data appear to be inadequate, the site information will be expanded using core penetration test (CPT) to define the spatial extent of the problem.

3. Seismic Evaluations. The general procedure for evaluating liquefaction potential, in one or more of several variations, involves a comparison of the dynamic stresses and the dynamic strengths in order to predict whether the specified earthquake could cause a loss of strength that could result in excessive strains or a possible flow slide. Initially, a simplified analysis technique will be used. It involves three basic steps:

(i) Estimate the dynamic stresses in the soil resulting from motions of the postulated maximum credible earthquake as given by the geological and seismological study. A one-dimensional wave propagation analysis method will be used for this purpose along with conservative estimates of necessary input parameters such as dynamic modulus, damping ratio, Poisson's ratio, modulus reduction (due to strain level), etc.
(ii) Determine the cyclic strength of the soil. An empirical approach based on the SPT blow counts will be used. This method was described by Seed, et al (1983) and requires, in addition to SPT blow counts, soil densities, piezometric levels, gradation and plasticity, strength dependency on initial static stress, static shear modulus and Poisson's ratio. These properties will be estimated from conservatively interpreted correlations based on past experience on similar soils. If CPT is used in the field explorations, proper site-specific correlations between CPT and SPT values will be developed.

(iii) Compare stresses and strengths. The factor of safety used in an evaluation of liquefaction potential is the ratio of the cyclic strength of a soil element to the cyclic stress imposed on it by the earthquake.

The result of the simplified analysis will be one of three conclusions: one, the dam is clearly safe against liquefaction; two, it is clearly unsafe; or three, the simplified analysis is inadequate to resolve the issue. If a conclusion of the first kind is reached, a permanent deformation analysis will be performed. Again a simplified procedure, the seismic coefficient analysis will be used. This is a pseudo-static analysis useful as a screening method. A seismic coefficient equal to one-half the predicted peak bedrock acceleration was found to assure, if the factor of safety is at least 1.0, that sliding deformations will be limited to 1 meter or less (Hynes-Griffin and Franklin, 1984).

If a conclusion of the second kind is reached, the consequences of the failure on downstream life and property will be evaluated. If the failure would constitute a hazard to human life or would cause extensive property damage, a plan and schedule for modifying the dam to ensure the safety of downstream life and property will be developed.

If a conclusion of the third kind is reached, then a decision must be made by Traverse City Light and Power as to whether more elaborate and rigorous dynamic analyses should be pursued and, if so, the scope of that effort. This decision involves such factors as the cost of additional studies, the cost of modifying the dam, etc.
Standard Method for

PENETRATION TEST AND SPLIT-BARREL
SAMPLING OF SOILS

This Standard is issued under the fixed designation D 1586: the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain representative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

2. Apparatus

2.1 Drilling Equipment—Any drilling equipment shall be acceptable that provides a reasonably clean hold before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in Section 3. To avoid “whips” under the blows of the hammer, it is recommended that the drill rod have a stiffness equal to or greater than the A-rod. An “A” rod is a hollow drill rod or “steel” having an outside diameter of 1 ½ in. (41.2 mm) and an inside diameter of 1 ½ in. (28.5 mm), through which the rotary motion of drilling is transferred from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15 m). The hole shall be limited in diameter to between 2 ⅛ and 6 in. (57.2 and 152 mm).

2.2 Split-Barrel Sampler—The sampler shall be constructed with the dimensions indicated in Fig. 1. The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four ¾-in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 Drive Weight Assembly—The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 Accessory Equipment—Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

3. Procedure

3.1 Clear out the hole to sampling elevation using equipment that will ensure that the material to be sampled is not disturbed by the operation. In saturated sands and silts withdraw the drill bit slowly to prevent loosening of the soil around the hole. Maintain the water level in the hole at or above ground water level.

3.2 In no case shall a bottom-discharge bit be permitted. (Side-discharge bits are permissible.) The process of jetting through an opentube sampler and then sampling when the desired depth is reached shall not be permitted. Where casing is used, it may not be driven below sampling elevation. Record any loss of

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224
circulation or excess pressure in drilling fluid during advancing of holes.

3.3 With the sampler resting on the bottom of the hole, drive the sampler with blows from the 140-lb (63.5-kg) hammer falling 30 in. (0.76 m) until either 18 in. (0.45 m) have been penetrated or 100 blows have been applied.

3.4 Repeat this operation at intervals not longer than 5 ft (1.5 m) in homogeneous strata and at every change of strata.

3.5 Record the number of blows required to effect each 6 in. (0.15 m) of penetration or fractions thereof. The first 6 in. (0.15 m) is considered to be a seating drive. The number of blows required for the second and third 6 in. (0.15 m) of penetration added is termed the penetration resistance, N. If the sampler is driven less than 18 in. (0.45 m), the penetration resistance is that for the last 1 ft (0.30 m) of penetration (if less than 1 ft (0.30 m) is penetrated, the logs shall state the number of blows and the fraction of 1 ft (0.30 m) penetrated).

3.6 Bring the sampler to the surface and open. Describe carefully typical samples of soils recovered as to composition, structure, consistency, color, and condition; then put into jars without ramming. Seal them with wax or hermetically seal to prevent evaporation of the soil moisture. Affix labels to the jar or make notations on the covers (or both) bearing job designation, boring number, sample number, depth penetration record, and length of recovery. Protect samples against extreme temperature changes.

4. Report

4.1 Data obtained in borings shall be recorded in the field and shall include the following:

4.1.1 Name and location of job,
4.1.2 Date of boring—start, finish,
4.1.3 Boring number and coordinate, if available,
4.1.4 Surface elevation, if available,
4.1.5 Sample number and depth,
4.1.6 Method of advancing sampler, penetration and recovery lengths,
4.1.7 Type and size of sampler,
4.1.8 Description of soil,
4.1.9 Thickness of layer,
4.1.10 Depth to water surface; to loss of water; to artesian head; time at which reading was made,
4.1.11 Type and make of machine,
4.1.12 Size of casing, depth of cased hole,
4.1.13 Number of blows per 6 in. (0.15 m),
4.1.14 Names of crewmen, and
4.1.15 Weather, remarks.
Note 1—Split barrel may be 1 ½ in. inside diameter provided it contains a liner of 16-page wall thickness.
Note 2—Core retainers in the driving shoe to prevent loss of sample are permitted.
Note 3—The corners at A may be slightly rounded.

Metric Equivalents

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FIG. 1 Standard Split Barrel Sampler Assembly.

By publication of this standard no position is taken with respect to the validity of any patents rights in connection therewith, and the American Society for Testing and Materials does not undertake to insure anyone utilizing the standard against liability for infringement of any Letters Patent nor assume any such liability.

1. S
1. using

2. Aj
2.1 equitably

2.2 2 to 5

between

penet
Boring No.: ONE (South Dike)

Ground Surface Elev.: 

Piling Method: EXCAVATED SOIL

Depth | Sample | Sampling Method | Penetration Resistance | Soil Classification
--- | --- | --- | --- | ---
1 | 55 | 3-3-7 | | GRAVEL
2 | 55 | 4-3-5 | | FLYASH
3 | 55 | 8-10-9 | | BROWN MEDIUM
4 | 55 | 1-2-6-14 | | SAND
5 | 55 | 4-5-5 | | TRACE
6 | 55 | 132939 | | SILT & GRAVEL
7 | 55 | 19-37-50 | | STARTED WATER INJECTION WHILE DRILLING
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End of Boring @ 50 1/2 Feet
### Soil Investigation

**Project:** Soil Investigation  
**Location:** Brown Bridge Pond  
**Client:** Traverse City Light & Power

#### Boring No.
- **TWO** (North Dike)
- **Weather:** Clear & Cool
- **Water Depth:** 15' Below Ground
- **Job Number:** 05019.03

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<th>Depth</th>
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<th>Sampling Method</th>
<th>Penetration Resistance</th>
<th>Soil Classification</th>
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Project: Soil Investigation
Location: Brown Bridge Pond
Client: Traverse City Light & Power

Date Started: May 8, 1985
Date Completed: May 8, 1985
Driller: BRK
Helper: ETM

Weather: Clear & Cool
Water Data: 15' Below Ground
Job Number: B5019.03
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**PROJECT:** SOIL INVESTIGATION  
**LOCATION:** BROWN BRIDGE POND  
**CLIENT:** TRAVERSE CITY LIGHT & POWER  
**DATE STARTED:** MAY 9, 1985  
**DATE COMPLETED:** MAY 9, 1985  
**DRILLER:** BRK  
**HELPER:** ETM  

**BORING NO.:** THREE  
**Weather:** P. CLOUDY & WARM  
**Ground Surface Elev.:** SURFACE  
**Water Data:** SURFACE  
**Job Number:** B5019.03
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</table>
### Soil Borings

**Brown Bridge Dam**

**Traverse City Light & Power**

**Boring No.** B-5 (Page 2 of 2)

**Ground Surface Elev.**

**Plugging Method** Excavated soils

**Weather** Partly cloudy, windy & cold

**Date Started** 10-14-92

**Date Completed** 10-14-92

**Driller** BRK **Helper** JS

**Water Data** 18' +

**Job Number** 92322.03

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<th>Soil Classification</th>
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**End of Boring 50'**
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# Soil Borings Details

**PROJECT:** Soil Borings  
**LOCATION:** Brown Bridge Dam  
**CLIENT:** Traverse City Light & Power  
**DATE STARTED:** 10-15-92  
**DATE COMPLETED:** 10-15-92  
**DRILLER:** AS  
**HELPER:** MH

### Boring No. B-7

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# Soil Borings

**Location:** Brown Bridge Dam

**Client:** Traverse City Light & Power

**Driller:** AS  
**Helper:** MH

**Date Started:** 10-22-92  
**Date Completed:** 10-22-92

**Weather:** Partly sunny 50°

**Ground Surface Elev.:**

**Water Data:** 6'+

**Job Number:** 92322.03

<table>
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<th>Sample</th>
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<th>Penetration Resistance</th>
<th>Soil Classification</th>
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MECHANICAL ANALYSIS

Project: Brown Bridge Soil Borings
Client: T.C. Light & Power
Material: 
Source: B4 @ 10-12'

Test No.: 1
Project No.: 92322.03
Date: 11-10-92
Tested By: Carl Studzinski

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TOTAL 357.6 100.0

Loss By Washing:

Initial Weight of Sample 357.6 gm.
Weight After Washing 354.6 gm.
Weight of Pan gm.
Passing No. 200 3.0 gm. 0.8 %

Weight of Crushed Particles
Total Weight of Sample
Crushed Particles %

This material meets does not meet project specifications.

Sampled by
Tested by
# MECHANICAL ANALYSIS

**Project:** Brown Bridge Soil Borings  
**Client:** T.C. Light & Power  
**Material:**  
**Source:** B4 @ 20-22'

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**Loss By Washing:**

- **Initial Weight of Sample:** 343.8 gm.  
- **Weight After Washing:** 342.0 gm.  
- **Weight of Pan:** gm.  
- **Passing No. 200:** 1.8 gm. 0.5 %

- **Weight of Crushed Particles:**  
- **Total Weight of Sample:**  
- **Crushed Particles:** %

*This material ___meets ___does not meet project specifications.*

**Sampled by:**  
**Tested by:**
# MECHANICAL ANALYSIS

**Project:** Brown Bridge Soil Borings  
**Client:** T.C. Light & Power  
**Material:**  
**Source:** B4 @ 26-28'

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**Loss By Washing:**

- **Initial Weight of Sample** 385.7 gm.
- **Weight After Washing** 384.0 gm.
- **Weight of Pan** gm.
- **Passing No. 200** 1.7 gm. 0.4 %

**Weight of Crushed Particles**

**Total Weight of Sample**

**Crushed Particles** %

- This material meets does not meet project specifications.

**Sampled by**

**Tested by**
MECHANICAL ANALYSIS

Project: Brown Bridge Soil Borings
Client: T.C. Light & Power
Material: B5 @ 10-12'
Source: B5 @ 10-12'
Test No.: 92322.03
Project No.: 92322.03
Date: 11-10-92
Tested By: Carl Studzinski

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Loss By Washing:

Initial Weight of Sample 362.9 gm.
Weight After Washing 360.1 gm.
Weight of Pan gm.
Passing No. 200 2.8 gm. 0.8 %

Weight of Crushed Particles
Total Weight of Sample
Crushed Particles %

This material ____ meets ____ does not meet project specifications.

Sampled by
Tested by
MECHANICAL ANALYSIS

Project: Brown Bridge Soil Borings
Client: T.C. Light & Power
Material: B5 @ 20-22'
Source: 92322.03
Date: 11-10-92
Tested By: Carl Studzinski

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Loss By Washing:

Initial Weight of Sample 345.2 gm.
Weight After Washing 342.2 gm.
Weight of Pan gm.
Passing No. 200 3.0 gm. 0.9 %

Weight of Crushed Particles
Total Weight of Sample
Crushed Particles %

This material meets does not meet project specifications.

Sampled by
Tested by
MECHANICAL ANALYSIS

Project: Brown Bridge SoilBORINGS
Client: T.C. Light & Power
Material: 
Source: B5 @ 32-34'

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Loss By Washing:

Initial Weight of Sample 283.1 gm.
Weight After Washing 193.8 gm.
Weight of Pan gm.
Passing No. 200 89.3 gm. 31.5 %

Weight of Crushed Particles
Total Weight of Sample
 Crushed Particles %

This material ___meets ___does not meet project specifications.

Sampled by
Tested by

Carl Studzinski
MECHANICAL ANALYSIS

Project: Brown Bridge Soil Borings
Client: T.C. Light & Power
Material: B7 @ 10-12'
Source: B7 @ 10-12'

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Loss By Washing:

Initial Weight of Sample 342.7 gm.
Weight After Washing 337.5 gm.
Weight of Pan gm.
Passing No. 200 5.2 gm. 1.5%

Weight of Crushed Particles
Total Weight of Sample
Crushed Particles %

This material meets does not meet project specifications.

Sampled by
Tested by
MECHANICAL ANALYSIS

Project: Brown Bridge Soil Borings  
Client: T.C. Light & Power  
Material:  
Source: B7 @ 20-22'

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Loss By Washing:

Initial Weight of Sample  285.0 gm.
Weight After Washing  273.9 gm.
Weight of Pan  
Passing No. 200  11.1 gm.  3.9 %

Weight of Crushed Particles  
Total Weight of Sample  
Crushed Particles  

This material  meets  does not meet  project specifications.

Sampled by  
Tested by  

Signed by Carl Studzinski

Date: 11-10-92

Project No.: 92322.03.
TP-1 is located on the crest, 350 feet from the power house.  
TP-2 is located at the toe of dam, 75 feet from the sub station  
TP-3 is located at the toe of dam, 150 feet from TP-2  
TP-4 is located 75 feet downstream from the sub station  
TP-5 is located 220 feet downstream from the crest and 15 feet  
TP-6 is located 320 feet downstream from the crest and 75 feet  
TP-7 is located 350 feet downstream from the crest and near  
TP-8 is located 450 feet downstream from the crest and 75 feet  

NOTE – ALL DISTANCES ARE APPROXIMATE. IF OBSTACLE AREAS PRESENT AT LOCATION SHOWN, MOVE AS NEEDED.
### TEST PIT LOG

**Date Started:** 2/6/03  
**Date Finished:** 2/6/03

**Inspector:** Matthew B. Miller, Ph.D.

**Project:** TCLP - Brown Bridge Spillway; Grand Traverse Co., MI

**Photo Log:** Yes  
**Excavation Contractor:** Traverse City Light & Power  
**Offset:** 10' DS

**Operator:** Kevin Bowden, Patrick Kendeziak  
**Excavation Equipment:** None  
**Surface Elevation:** 802.2 Ft.

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample No.</th>
<th>Legend</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-0.6</td>
<td>Bag1</td>
<td>Dark gray Poorly Graded SAND (sp), (Frozen A-Horizon); No reaction w/HCl</td>
<td>Fine to medium roots</td>
<td></td>
</tr>
<tr>
<td>0.6-4.2</td>
<td></td>
<td>Yellowish brown Poorly Graded SAND with Silt (SP-SM), moist, single-grain, loose consistency, trace gravel; No reaction w/HCl</td>
<td>Hand dug pit to 2.0'; bucket auger 2.0' to 4.2', possible electric utility cable at 4.2'</td>
<td></td>
</tr>
</tbody>
</table>

**Bottom of Test Pit = 4.2 Ft.**

**Remark:** Hand dug pit dimensions 2'x2'x2'. Excavation halted due to possible electrical cables.

0300001mb
<table>
<thead>
<tr>
<th>Depth (FL)</th>
<th>Sample No.</th>
<th>Legend</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 2.0</td>
<td>Bag 1</td>
<td></td>
<td>0.0’ to 2.0’; Frozen and compacted Very dark brown Silty SAND (sm) (Frozen and compacted Topsoil)</td>
<td>Fine roots</td>
</tr>
<tr>
<td>2.0 - 3.5</td>
<td>Bag 2</td>
<td></td>
<td>2.0’ - 3.5’; Dark brown Poorly Graded SAND (SP), moist, single grain, loose; No reaction with HCl</td>
<td>EL 761.2’</td>
</tr>
<tr>
<td>3.5 - 5.2</td>
<td>Bag 3</td>
<td></td>
<td>3.5’ - 5.2’; Light yellowish brown Poorly Graded SAND (SP), moist, single grain, loose; No reaction with HCl</td>
<td>EL 788.0’</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bottom of Test Pit = 6.2 FL</td>
<td>Wet at 4.5’</td>
</tr>
</tbody>
</table>

Remarks:
Backhoe pit dimensions: 2’ wide, 6’ long, 6.5’ deep. Depth of hand auger 3.5’ to 5.2’ bags. Excavation halted due to saturated soil. 42’ from center line of E. Embankment Road.

0303603mb
**TEST PIT LOG**

**Date Started:** 2/5/03  
**Date Finished:** 2/6/03  
**Total Depth of Pit:** 1.4 Ft.  
**Test Pit No.:** TP-3  
**Sheet 1 of 3**  
**Line & Station:** 2+00  
**Offset:** 64' DS  
**Project:** TCLP - Brown Bridge Spillway; Grand Traverse Co., MI  
**Inspector:** Matthew B. Miller, Ph.D.  
**Photographic Log:** Yes ☑ No ☐  
**Excavation Contractor/Traverse City Light & Power**  
**Operator:** Kevin Bowden, Patrick Kandziora  
**Surface Elevation:** 790.6 Ft.  
**Excavation Equipment:** John Deere 310 B Backhoe; 2' bucket  
**N Coordinate:**  
**E Coordinate:**

### Groundwater Observations

**At 1.4 Ft. After 0 hours**

<table>
<thead>
<tr>
<th>Depth (Ft.)</th>
<th>Sample No.</th>
<th>Legend</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 0.9</td>
<td>Bag 1</td>
<td></td>
<td>0.6-0.9'; Black, highly organic, Poorly Graded SAND (so), moist; No reaction w/ HCl</td>
<td>many fine to medium roots</td>
</tr>
<tr>
<td>0.9 - 1.4</td>
<td>Bag 2</td>
<td></td>
<td>0.3'-1.4'; Mixed sample color: Brown, Poorly Graded SAND with Silt (SP-GM), moist to wet; No reaction w/HCl</td>
<td>Few fine roots</td>
</tr>
</tbody>
</table>

Bottom of Test Pit = 1.4 Ft.

**Remarks:** Backhoe Pit Dimensions 2' x 2' x 1.4' deep  
Excavation halted due to saturated soil.

030602imb

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**40782**

**02010- A3**
<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample No.</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0'-0.5'; Dark brown Poorly Graded SAND (sp); No reaction w/HCl</td>
<td></td>
<td>Many fine roots</td>
<td></td>
</tr>
<tr>
<td>0.5'-1.5'; Pale brown Poorly Graded SAND (sp), moist, single-grain, loose consistency; No reaction w/HCl (Eluvial Horizon; Light gray 10YR 7/2 dry)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5'-3.0'; Reddish yellow Poorly Graded SAND (sp), moist, single grain, loose consistency; No reaction w/HCl (SW-illuvial Horizon; Iron oxides) Few strong brown iron oxide clusters - &quot;Orlstein&quot;-like; weak cementation, 1/2&quot; diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0'-5.6'; Brown Poorly Graded SAND (sp), moist, single grain, loose consistency, trace gravel; No reaction w/HCl</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0'-6.6'; Brown Poorly Graded SAND (sp), moist, single grain, loose consistency, trace gravel; strong brown iron oxide (&lt;1/2&quot; clayey bands) Illuvial clay</td>
<td></td>
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</tr>
</tbody>
</table>

Remarks: Backbone Pit Dimensions 2'x8'x6.6' deep
Excavation halted due to cave in at 2.0' to 5.5'

030003mb
**TEST PIT LOG**

**Date Started:** 2/6/03  
**Date Finished:** 2/6/03  
**Total Depth of Pit:** 4.5 Ft.  
**Inspector:** Matthew B. Miller, Ph.D.  
**Project:** TCLP - Brown Bridge Spillway, Grand Traverse Co., MI  
**Extraction Contractor:** Traverse City Light & Power  
**Operator:** Kevin Bowden, Patrick Kandziorek  
**Excavation Equipment:** John Deere, 510 66 Backhoe; 2 bucket  
**Surface Elevation:** 786.2 Ft.  
**Sheet:** 1 of 1  
**Line & Station:** 2+37  
**Offset:** 106' DS  

**Groundwater Observations**  
At 4.4 Ft. After 0 hrs.

<table>
<thead>
<tr>
<th>Depth (Ft)</th>
<th>Sample No.</th>
<th>Legend</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 - 4.0</td>
<td>Bag 1</td>
<td></td>
<td>0.0-0.76; Very dark brown, Poorly Graded SAND (sp); No Reaction w/ HCl (A-Horizon)</td>
<td>Common to many fine to coarse roots</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.76-2.25; Dark brown, Poorly Graded SAND (SP), moist, single grain; loose consistency, No reaction w/HCl (B-W-Horizon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.25-4.6; Light yellowish brown, Poorly Graded SAND (SP), moist, single grain; loose; No Reaction w/HCl (C-Horizon)</td>
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</tbody>
</table>

**Remarks:**  
Backhoe Pit Dimensions: 2'x2'x3.6'  
Depth of Hand auger: 3.6' to 4.5'  
Excavation Halted Due to Cave In 2.3'-4.4'  
030603Sel

**Test Pit No.: TP-5**
**TEST PIT LOG**

**Date Started:** 2/6/03  
**Date Finished:** 2/5/03  
**Total Depth of Pit:** 8.4 Ft.  
**Inspector:** Matthew B. Miller, Ph.D.  
**Project:** TCLP - Brown Bridge Spillway; Grand Traverse Co., MI  
**Excavation Contractor:** Traverse City Light & Power  
**Operator:** Kevin Bowden, Patrick Kedzierski  
**Excavation Equipment:** John Deere, 310 60 Backhoe; 2' bucket  
**Surface Elevation:** 789.4 Ft.  
**Remarks:**
- Backhoe Pit Dimensions 2'x6'x5.4'  
- Excavation Halted Due to Cave In 1.4'-5.4'

### Legend

<table>
<thead>
<tr>
<th>Depth (FL)</th>
<th>Sample No.</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0'-0.2'</td>
<td></td>
<td>Black, Poorly Graded SAND (sp); No reaction w/HCl</td>
<td></td>
</tr>
<tr>
<td>0.3'-0.75'</td>
<td></td>
<td>Strong brown Poorly Graded SAND (sp), moist (light iron oxide accumulation); No reaction w/HCl</td>
<td></td>
</tr>
<tr>
<td>0.75'-5.4'</td>
<td></td>
<td>Light yellowish brown Poorly Graded SAND (sp), moist, single grain, loose consistency; No reaction w/HCl</td>
<td></td>
</tr>
</tbody>
</table>

**Test Pit No.:** TP-6  
**Line & Station:** 1+53  
**E Offset:** 261' DS  
**N Coordinate:**  
**E Coordinate:**  
**Sheet:** 1 of 2  
**x of yyyy:**  

---

**Notes:**
- Many fine-medium roots at EL 787.9'  
- Common fine to coarse roots at 0.75'-1.75' EL 787.7'
### Test Pit Log

**Date Started:** 2/6/03  
**Date Finished:** 2/6/03  
**Total Depth of Pit:** 2.2 Ft.

**Inspector:** Matthew B. Miller, Ph.D.  
**Photographic Log:** Yes  
**Excavation Contractor:** Traverse City Light & Power  
**Excavation Equipment:** Hand Auger  
**Surface Elevation:** 771.1 Ft.

<table>
<thead>
<tr>
<th>Depth (Ft.)</th>
<th>Sample No.</th>
<th>Legend</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 1.0</td>
<td>Bag 1</td>
<td></td>
<td>0.0-1.0' Black Sапрic PEAT; No reaction w/HCl</td>
<td>Many fine and medium roots</td>
</tr>
<tr>
<td>1.0 - 2.0</td>
<td>Bag 2</td>
<td></td>
<td>1.0-2.2' Light brown Poorly Graded SAND (mp); moist, mingled with black and gray, few gravel, single grain, loose consistency; No reaction w/HCl</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  
Depth of hand auger 0 to 2.2'  
Excavation halted due to saturated soil  
Water flowing on ground surface every 25 feet
**TEST PIT LOG**

**Date Started:** 2/6/03  
**Date Finished:** 2/6/03  
**Total Depth of Pit:** 5.5 Ft.  
**Inspector:** Matthew B. Miller, Ph.D.  
**Photographic Log:** Yes  
**Excavation Contractor:** Traverse City Light & Power  
**Excavation Equipment:** John Deere 310 E6 Backhoe; 2' bucket  
**Surface Elevation:** 803.7 Ft.

<table>
<thead>
<tr>
<th>Depth (FT)</th>
<th>Sample No.</th>
<th>Legend</th>
<th>Description of Materials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>0.0-0.5'; Black Poorly Graded SAND (sp)</td>
<td>No reaction w/HCl</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>0.5-5.5'; Brownish yellow Poorly Graded SAND (SP), moist single-grain; loose consistency; No reaction w/HCl</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** Backhoe pit dimensions 2'x3.5x5.5' deep  
Excavation Halted Due to cave in 1.0-3.5'  
030603uel