Metro Waste Authority

Metro Park West Landfill

Construction Documents Project Manual

P-64 – MPW Cell D Liner & Greene Co. LF Improvements

Issued for Bid

January 30, 2023

2499 337th Street
Perry, Iowa 50220

hdrinc.com
(402) 399-1000
1917 S 67th Street
Omaha, NE 68106

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

DIVISION 00

PROCUREMENT AND CONTRACTING REQUIREMENTS

THIS PAGE INTENTIONALLY LEFT BLANK

00 01 07

SEALS AND SIGNATURES

I hereby certify that these engineering documents were prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Katie Kinley 1/30/2023

Katie Kinley, P.E. 01/30/2023
Iowa License No. P26021
My license renewal date is December 31, 2023.

Pages or sheets covered by this seal:

Divisions 00, 01, 02, 10, 31, 32, 33, 40

END OF SEALS AND SIGNATURES

THIS PAGE INTENTIONALLY LEFT BLANK

METRO WASTE AUTHORITY
PERRY, IOWA
PROJECT P-64 – CELL D LINER AND GREENE CO. LANDFILL IMPROVEMENTS

SECTION 00 10 00
NOTICE OF HEARING AND LETTING

Notice is hereby given that there are on file with Metro Waste Authority (the Authority*),* in the County of Boone and Greene, State of Iowa a request for proposal (RFP) for construction of a new landfill cell (Cell D) and other site improvements at the Metro Park West Landfill located in Perry, Iowa. Cell construction includes: Bulk excavation, hauling, placement and stockpiling of on-site soils; processing on-site borrow soils; construction of recompacted clay liner and geomembrane liner; geotextiles; granular soils; collection piping; construction of storm water conveyance and pollution prevention structures; fencing and gates, roadway construction and roadway surfacing, leachate collection improvements at the Greene County closed landfill including, but not limited to, excavation, trenching, HDPE pipe fusing and installation, access point riser installation, temporary leachate, stormwater, and groundwater management, lift station, flowmeter and meter manhole, gas collection infrastructure, electrical, sediment removal, topsoiling, seeding and fertilizing, and erosion controls; and the work required by the Drawings and Specifications.

Sealed Bids for the design and construction of the **P-64 Cell D Liner and Greene Co. Landfill Improvements (Project)** will be received, by the Authority, at the office of the **Metro Waste Authority, 300 E. Locust Street, Suite 100, Des Moines, Iowa 50309**, until **3:00 o'clock PM** local time on **February 22, 2023**, at which time the Bids received will be opened and publicly read by the Authority's representative. A hearing will be conducted on the RFP at a meeting of the Authority to be held at the Authority's office at 300 East Locust Street, Suite 100 in Des Moines, Iowa, at 5:45 PM, on March 15, 2023*,* at which time and place any person may appear and file objections to the proposed RFP for said public improvements. Sealed bids previously received for such project will be presented to and considered by the Authority immediately after the termination of said hearing. Bids received will be acted upon at such time and place or at such later time and place as may then be fixed.

The Project shall be commenced on March 30, 2023. All work shall be completed including punch list, final walkthrough, and ready for final payment on or before August 15, 2023, subject to any extension of time which may be granted by the Authority.

Information and Bidding Documents for the Project can be obtained at the following designated website:

Quest Construction Data Network, LLC
http://www.questcdn.com
PO Box 412
Spring Park, MN 55384-0412
Telephone: (952) 233-1632
Email: info@questcdn.com

On http://www.questcdn.com, search for Quest eBidDoc #8375389.

If downloading from QuestCDN for the first time, you will need to create a free membership account prior to downloading. Please contact QuestCDN for assistance with free membership registration, downloading and working with this digital project information. There will be no cost to the Bidder for downloading Bidding Documents from QuestCDN.

Bidding Documents may be downloaded from the designated website. Prospective Bidders are urged to register with the designated website as a Bidding Documents holder, even if Bidding Documents are obtained from a third-party plan room or source other than the designated website in either electronic or paper format. The designated website will be updated periodically with Addenda, lists of registered Bidding Documents holders, reports on the Site, and other information relevant to submitting a Bid for the Project. All official notifications, Addenda, and other Bidding Documents will be offered only through the designated website. Neither Owner nor Engineering will be responsible for Bidding Documents, including Addenda, if any, obtained from sources other than the designated website.

The Issuing Office for the Bidding Documents is:

HDR Engineering, Inc.
300 East Locust Street, Suite 210
Des Moines, IA 50309-1823
Attn. Austin Broshar
Phone (402) 208-0662
Email: Austin.Broshar@hdrinc.com

Prospective Bidders may review the Bidding Documents at the Issuing Office on Mondays through Fridays between the hours of 9:00 AM and 4:00 PM local time and may obtain copies of the Bidding Documents from the Issuing Office as described above, or by contacting the bid administrator, Austin Broshar at Austin.Broshar@hdrinc.com, (402) 208-0662. Paper copies of the Bidding Documents may be obtained from the Issuing Office by paying a deposit of $200 for each set. Bidders who return full sets of the Bidding Documents in good condition within 14 days after receipt of Bids will receive a full refund. Non-Bidders, and Bidders who obtain more than one set of the Bidding Documents, will receive a refund of $200 for documents returned in good condition within the time limit indicated above. Make deposit checks for Bidding Documents payable to HDR Engineering, Inc.

A non-mandatory pre-bid conference will be held on February 9, 2023, at 10:30 A.M. at the administrative office of the **Metro Park West Landfill, 2499 337th Street, Perry, Iowa 50220**. Bidders may arrange to visit the site at other times by contacting the bid administrator. Bids will be received for a single prime Contract. Bidder shall submit their terms and conditions for the Authority to review before entering into a contract. Bids shall be on a lump sum and unit price basis, with alternate bid items as indicated in the Bid Form, as required. Questions regarding project bidding will be received by the Authority and the Engineer until the end of day on February 17, 2023 from Bidders.

Each Bidder shall accompany a bid with a bid security. Bid security shall be furnished in accordance with the Instructions to Bidders.

A summary of information included herein is provided below for the Prospective Bidder's convenience:

Project Title:	MWA Project P-64 – Cell D Liner and Greene Co. Landfill
Project Description:	Project Consists of the Following Major Elements at the Metro Park West Landfill: • Cell D Bulk Excavation, Hauling, Placement, and Stockpiling • Cell D Liner and Leachate System • Cell D Storm Water Conveyances • Access Road Construction and Surfacing • Greene Co. Leachate Collection Improvements
Project Location(s):	Metro Park West Landfill, 2499 337th Street, Perry, Iowa 50220
Public Hearing:	March 15, 2023

Issuing Office:	HDR Engineering, Inc. 300 East Locust Street, Suite 210 Des Moines, Iowa 50309-1823 Austin.Broshar@hdrinc.com, (402) 208-0662
Bid Opening:	February 22, 2023 at 3:00 PM local time
Bid Award	March 15, 2023 at 5:45 PM local time
Submit Bids To:	Metro Waste Authority Attn: Brian Wambold 300 East Locust Street, Suite 100 Des Moines, IA 50309
Project Dates:	Commencement: March 30, 2023 Substantial Completion: July 15, 2023 All Work complete for final billing by August 15, 2023

The Authority reserves the right to reject any or all bids, to re-advertise for new bids and to waive informalities that may be in the best interests of the Authority.

Published upon order of the Authority.

Owner: **Metro Waste Authority**

By: **Brian Wambold**

Title: **Operations Manager**

Date: January 30, 2023

+ + END OF ADVERTISEMENT FOR BIDS + +

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 20 00
SUGGESTED INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

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

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

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the Notice of Hearing and Letting.

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

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

2.04 Electronic Copies of Files:

A. Electronic copies of AutoCAD 2020 (.DWG) model files of existing and proposed surfaces from the Contract Document Drawings will be made available for informational purposes only to plan holders on Digital Compact Discs (CDs or flash drives) included with the hard copy Contract Documents.

B. Recipients of these electronic files, by virtue of opening the files, agree to and accept the following disclaimer and indemnification provisions which have been embedded in the CD's and included with the model files:

1. "The data contained in this electronic media is an instrument of service prepared by HDR Engineering, Inc. (Engineer) for the Metro Waste Authority (Owner) and is the exclusive property of the Engineer.

2. Any unauthorized reuse of the data contained herein by the recipient shall be at the recipient's sole risk.

3. By opening this file the recipient agrees to indemnify, defend and hold harmless the Engineer and Owner from any claims or liability allegedly arising from such actions.

4. Because data stored in electronic media format can deteriorate or be modified inadvertently, or otherwise, without authorization of the data's creator, the party receiving electronic files agrees this data furnished by Owner or Engineer to recipient in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party.

5. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk.

6. This may not be a complete set of Conformed Drawings, figures, sketches, calculations, attachments, and information and does not contain changes, clarifications, supplements, interpretations which result from actual construction, field order, change orders, change directives, and Owner supplements, except as specifically noted.

7. These Documents are complementary to and must be used in conjunction with the other Drawings and Technical Specifications. Bidding and Contract Document documentation that may be relied upon are limited to the printed copies (also known as hard copies) distributed by the Owner or Engineer.

8. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

9. In transferring documents in electronic format, the transferring party makes no representations as to the current or long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

10. The system software from which the digital files were created is AutoCAD Version 2020.

11. Surface data may additionally be presented in .XML format and displayed in both TIN and Polyline format."

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

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

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

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

C. Subcontractor and Supplier qualification information.

D. Other required information regarding qualifications.

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

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

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

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

4.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions:

1. The Supplementary Conditions identify:

a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.

b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

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

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

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

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

4.03 *Site Visit and Testing by Bidders*

A. Bidder shall conduct Site visits during normal working hours in coordination with Brian Wambold of MWA at the site and shall not disturb any ongoing operations at the Site.

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

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

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

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

4.04 *Owner's Safety Program*

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

4.05 *Other Work at the Site*

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

ARTICLE 5 – BIDDER'S REPRESENTATIONS

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

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

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

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

E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

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

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

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

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

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

ARTICLE 6 – PRE-BID CONFERENCE

6.01 A pre-Bid conference will be held at the time and location stated in the Notice of Hearing and Letting (Section 00 10 00). Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

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

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

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates, if applicable) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

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

8.03 Owner shall promptly return the Bid security of unsuccessful bidders to the bidders as soon as the successful bidder is determined or within thirty (30) days, whichever is sooner.

ARTICLE 9 – CONTRACT TIMES

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

ARTICLE 10 – LIQUIDATED DAMAGES

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

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

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

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

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

12.03 The apparent low Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list, on the form entitled *Tabulation of Subcontractors and Suppliers* attached hereto as Exhibit A, of the Subcontractors and Suppliers proposed for the portions of the Work as identified on Exhibit A.

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

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

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

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

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

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

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

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

13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.

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

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

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

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

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

ARTICLE 14 – BASIS OF BID

14.01 *Lump Sum / Unit Price*

A. Bidders shall submit a Bid on a firm fixed price basis for both lump sum and unit price items as set forth in the Bid Form.

14.02 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total

will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

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.

14.03 *Allowances*

A. For cash allowances see Section 01 21 00.

ARTICLE 15 – SUBMITTAL OF BID

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

15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the Notice of Hearing and Letting and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to:

ATTN: Brian Wambold
Metro Waste Authority
300 East Locust Street, Suite 100
Des Moines, IA 50309

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

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

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

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

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

ARTICLE 17 – OPENING OF BIDS

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

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

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

19.02 If Owner awards the contract for the Work, such award shall be to the lowest responsive, responsible Bidder.

19.03 Evaluation of Bids:

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

B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

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

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

ARTICLE 20 – BONDS AND INSURANCE

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

ARTICLE 21 – SIGNING OF AGREEMENT

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

ARTICLE 22 – SALES AND USE TAXES

22.01 Owner is exempt from Iowa state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. 42-720039K). Said taxes shall not be included in the Bid. Refer to Paragraph SC-7.09 of the Supplementary Conditions for additional information.

EXHIBIT A

TABULATION OF SUBCONTRACTORS AND SUPPLIERS

Name of Firm Submitting Bid: _____

The following subcontractors and suppliers will be utilized for portions of the project work. Following submittal of this form, changes shall not be made unless the change(s) is approved by the Owner.

Subcontractor	Classification of Work	Estimated Dollar Amount
Supplier		Estimated Dollar Amount

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 41 00
BID FORM
METRO WASTE AUTHORITY
PROJECT P-64 – CELL D LINER AND GREENE CO. LANDFILL IMPROVEMENTS

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:
Metro Waste Authority
300 East Locust Street, Suite 100
Des Moines, IA 50309

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

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

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

2.02 BIDDER will sign and deliver the required number of counterparts of the AGREEMENT with the Bonds and other documents required by the Bidding Requirements within 15 days after the date of OWNER's Notice of Award.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

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

Addendum No.	**Addendum, Date**

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

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

D. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

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

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

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

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

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

J. Bidder has examined and carefully prepared the proposal from the Bidding Documents and has checked the same in detail before submitting this Bid.

K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Contract.

L. Bidder agrees to waive any claim it has or may have against the Owner, the Engineer and the respective employees, arising out of or in connection with the administration, evaluation or recommendation of the Bid.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

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

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

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

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

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

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

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

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

ARTICLE 5 – BASIS OF BID

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

Item No.	Description	Estimated Quantity	Unit	Bid Unit Price	Bid Price
101	Mobilization, demobilization, and all work not included in Bid Item Nos. 102 through 108	1	LS		
102	Construct Cell D Liner and Leachate Collection System	1	LS		
103	Construct Greene Co. Landfill Improvements	1	LS		
104	Construct Perimeter Access Road Surfacing	1	LS		
105	Bulk Excavation to Cell D and Perimeter Road Base Grade Elevations	20,000	CY		
106	Structural Fill to reach Cell D, Phase 2 Access Road, and Perimeter Road Base Grade Elevations	11,760	CY		
107	Remove and Replace Unsuitable Soils Below Base Grade (Cell D Liner System)	1,000	CY		
108	Seeding Disturbed Areas (Install Owner supplied amended topsoil. Install Seed, Fertilize, and Mulch)	2.0	AC		
109	Allowance (5% of Total Combined Price of Bid Items 101 – 108)	1	LS		
A110	Bid Alternate Item A110 - Security Fencing and Gate	2,500	LF		

Item No.	Description	Estimated Quantity	Unit	Bid Unit Price	Bid Price
A111	Bid Alternate Item A111 – Phase 2 Access Road to Cell D Aggregate Surfacing	1	LS		
A112	Bid Alternate Item A112 – Tipping Pad Turnaround Area Aggregate Surfacing	1	LS		
A113	Bid Alternate Item A113 – MW-16 Electrical Line Renovations	1	LS		
A114	Bid Alternate Item A114 – Metering Manhole and Flowmeter	1	LS		
A115	Bid Alternate Item A115 – Cell B Sump Solar Panel Pump Unit	1	LS		
A116	Bid Alternate Item A116 – Greene Co. Gas Infrastructure Improvements	1	LS		
A117	Bid Alternate Item A117 – Excavation of Excess Soils to Building Pad Structural Fill	3,000	CY		

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

Total Base Bid Price for Bid Items 101 through 109
(Total of Lump Sum and Unit Price Bids = Total Bid Price)

$ _____
(numerals)

_____
(words)

Total Alternate Bid Price for Bid Items 101 through 117
(Total of Lump Sum and Unit Price Bids = Total Alternate Bid Price)

$ _____
(numerals)

_____
(words)

5.02 If the Contract is to be awarded, it will be awarded to the lowest responsive Bidder for the Work selected by Owner (Items 101-109, with consideration of the alternate bid items, Items 110 – 117). Owner will select the Work that will be in the best interest of the Owner.

5.03 Contractor computed quantity for bulk excavation is not guaranteed. Daily operational activities may result in varying quantities of soil to be excavated. Contractor to provide alternate pricing for various quantities that may be encountered. Owner will confirm quantity of soil excavation in addition to base bid with Contractor during Contract Negotiations. Total amount will be the unit price multiplied by the highest quantity of the range. Contractor to provide both unit price and total amount for the highest quantity of the range for all line items.

5.04 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

5.05 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 6 – ATTACHMENTS TO THIS BID

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

A. Required Bid security;

B. List of Project References;

C. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

D. Required Bidder Qualification Statement with supporting data.

ARTICLE 7 – DEFINED TERMS

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

ARTICLE 8 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

State Contractor's
License No.: _____
(where applicable)

END OF BID FORM

SECTION 00 43 50
BID BOND

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

BIDDER *(Name and Address)*:

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

OWNER *(Name and Address)*:

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

BOND
Bond Number:
Date:
Penal sum _____ $ _____
(Words) (Figures)

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

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

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venture's, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder that submitted a responsive Bid as determined by Owner for the work required by the Contract Documents, provided that:

1.1 If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the penal sum set forth on the face of this Bond, and

1.2 In no event shall Bidder's and Surety's obligation hereunder exceed the penal sum set forth on the face of this Bond.

1.3 Recovery under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

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

3. This obligation shall be null and void if:

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

3.2 All Bids are rejected by Owner, or

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

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

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

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

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

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

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

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

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

SECTION 00 45 10
QUALIFICATION STATEMENT
FOR
METRO WASTE AUTHORITY
PROJECT P-64 – CELL D LINER AND GREENE CO. LANDFILL IMPROVEMENTS

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

Note: Contractors who do not complete the following questionnaire are subject to being deemed "non-responsive".

1. SUBMITTED BY:

Official Name of Firm: _____

Address: _____

_____

_____

2. SUBMITTED TO: _____

3. SUBMITTED FOR: _____

Owner: _____

Project Name: _____

_____

_____

TYPE OF WORK: _____

_____

_____

4. CONTRACTOR'S CONTACT INFORMATION:

Contact Person: _____

Title: _____

Phone: _____

Email: _____

5. AFFILIATED COMPANIES:

Name: _____

Address: _____

_____

_____

6. CONTRACTOR INFORMATION:

All other names under which Contractor has operated in the past five (5) years.

_____

_____

_____

Federal Employee Identification Number: _____

7. TYPE OF ORGANIZATION (Check one):

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

_____

_____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

_____

_____

- Treasurer: _____

- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization: _____

Date of Organization: _____

Members: _____

_____

_____

_____

☐ JOINT VENTURE

Sate of Organization: _____

Date of Organization: _____

Form of Organization: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

8. REGISTRATION (Iowa Code Chapter 91C)

Contractor Registration Number: _____

Full Names of Registration Holders (as per Iowa Construction Contractor Registration requirements): _____

_____

_____

Contractor Registration Expiration Date: _____

9. LICENSING:

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

10. CERTIFICATIONS: CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

11. BONDING INFORMATION:

Bonding Company: _____

Address: _____

_____

Bonding Agent: _____

Address: _____

_____

_____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

12. FINANCIAL INFORMATION:

Financial Institution: _____

Address: _____

_____

Account Manager: _____

Phone: _____

Indicate approximate total bonding capacity of Contractor:

_____ $500,000 - $2,000,000
_____ $2,000,000 - $5,000,000
_____ $5,000,000 - $10,000,000

***INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE LAST 3 YEARS**

13. SUSPENSION, REVOCATION, DEBARMENT:

a. Has Contractor's Registration ever been suspended or revoked in any jurisdiction?

□ Yes □ No

If Yes, provide information regarding suspension/revocation and attach all relevant documents.

b. Within the past five (5) years, has Contractor been debarred by any federal, state or local governmental entity from bidding on projects?

□ Yes □ No

If Yes, provide information regarding debarment and attach all relevant documents.

14. CONSTRUCTION EXPERIENCE:

a. On Schedule A or an equivalent attachment, provide details of projects currently under construction by Contractor (If joint venture, list participant's projects separately).
b. On Schedule B or an equivalent attachment, identify the individuals Contractor intends to be Officer in Charge, Project Manager, Project Superintendent, and any other key personnel on this Project. Include a resume and/or recent work history for each identified individual showing landfill construction related experience.

c. On Schedule C or an equivalent attachment, for work Contractor intends to self-perform on the Project, specify the level of training and experience each of Contactor's employees have had. Further indicate whether any such training has been in a United States Department of Labor ("DOL") certified apprentice program. In the event Contractor intends to utilize apprentice workers on the Project, Contractor must be able to provide, upon Owner's request, documentation that each apprentice worker utilized on the Project is properly registered as participating in a DOL certified apprentice program.

d. On Schedule D or an equivalent attachment, list Contractor's last five (5) completed projects and for each, the scheduled completion date and final completion date, noting any owner-approved extensions. Contractor shall include on this schedule documentation that he has completed a minimum of fifty (50) acres of landfill construction projects (cell and/or closure) within the past five (5) years involving geosynthetic and recompacted clay components.

e. Has Contractor ever defaulted on a contract, or been disqualified, removed or otherwise prevented from bidding on, or completing any project?

□ Yes □ No

If yes, provide the year of the incident, name and address, phone number of the Owner of the project, the project name and location on an attachment.

f. Has Contractor ever failed to complete any work awarded to it?

□ Yes □ No

If yes, provide the year of the incident, name and address, phone number of the Owner of the project, the project name and location on an attachment.

g. Has any corporate officer, partner, joint venture participant or proprietor of Contractor ever failed to complete a construction contract awarded to him or her in his or her own name or when acting as a principal of another organization?

□ Yes □ No

If yes, provide the year of the incident, name and address, phone number of the Owner of the project, the project name and location on an attachment.

h. In the last five (5) years, has Contractor ever failed to substantially complete a project in a timely manner?

□ Yes □ No

If yes, provide the year of the incident, name and address, phone number of the Owner of the project, the project name and location on an attachment.

i. Does Contractor have projects not listed on Schedule A which commenced within the past four (4) years and have not reached final completion?

□ Yes □ No

If yes, provide the year of the incident, name and address, phone number of the Owner of the project, the project name and location.

j. Has Contractor ever been unable to obtain a bond or been denied a bond?

□ Yes □ No

If yes, provide all relevant details on an attachment.

k. On Schedule E, provide names of all surety/bonding companies Contractor has utilized in the past five (5) years. Include agent's name, address and phone number.

l. Has Contractor ever declared bankruptcy or been in receivership?

□ Yes □ No

If yes, provide all relevant details on an attachment.

m. Is Contractor currently being investigated for or previously been found to have violated in the last five (5) years any of the following state or federal laws: Iowa Minimum Wage Act, Iowa Non-English Speaking Employees Act, Iowa Child Labor Act, Iowa Labor Commissioner's Right to Inspect Premises, Iowa Compensation Insurance Act, Employment Security Act, Iowa Competition Act, Iowa Income, Corporate and Sales Tax Code, a "willful" violation of the Iowa or Federal Occupational Safety and Health Act, Iowa Employee Registration Requirements, Iowa Hazardous Chemical Risks Act, Iowa Wage Payment Collection Act, Federal Income and Corporate Tax Code, The National Insurance Security Act, The Fair Labor Standards Act:

□ Yes □ No

If yes, provide all relevant details on an attachment.

n. Are there any judgments, arbitration proceedings or suits pending or outstanding against Contractor or its officers?

□ Yes □ No

If yes, provide all relevant details on an attachment.

o. Has Contractor filed any lawsuit or demanded arbitration with regard to any construction contract within the past five (5) years?

□ Yes □ No

If yes, provide all relevant details on an attachment.

p. Has Contractor been found by a court or agency of competent jurisdiction to be delinquent in meeting its obligations under local, state or federal tax laws within the last five (5) years? For purposes of this Question, "delinquent" shall include, but is not limited to, failure to file, failure to pay, or imposition of tax liens.

□ Yes □ No

If yes, provide all relevant details on an attachment.

q. Contractor affirms that it will retain only subcontractors who can fully comply with the Bid Specifications.

□ Yes □ No

r. Contractor affirms that is will be responsible for ensuring that each subcontractor meets quality assurance Specifications as presented in the Bid Specifications.

□ Yes □ No

s. Contractor agrees to submit to Owner a list of all intended subcontractors at the time of bid. In the event Contractor wants to replace any originally-designated subcontractor, such may occur only with the approval of Owner. Such approval will not be unreasonably withheld.

□ Yes □ No

t. Contractor attests that it will comply with each of the following:

Iowa Minimum Wage Law:

□ Yes □ No

Maintain workers' compensation insurance or be qualified as a self-insurer and provide proof of insurance or ability to self-insure upon request:

□ Yes □ No

Properly license all Contractor employees with the appropriate licensing authority:

□ Yes □ No

u. Contractor will make available to Owner or its representative, upon request, documentation necessary to satisfy Owner, in its sole discretion, that Contractor's workers utilized on this Project are actual employees, with unemployment and worker's compensation coverage, and are not "leased employees" or independent contractors.

□ Yes □ No

v. Contractor will provide with this Statement of Bidder's Qualifications, the name, address, phone number and name of a contact person for three (3) entities that will provide references for Contractor.

□ Yes □ No

15. SAFETY PROGRAM:

a. Contractor will only utilize on-site employees who have completed the Occupational Safety and Health Act (OSHA) 10 Hour Construction Industry Training Program.

□ Yes □ No

b. State the general type(s) of work performed by Contractor with its own work force.

c. Describe Contractor's permanent safety program, and provide name(s) of individual(s) responsible for safety procedures on this Project.

d. Name of Contractor's Safety Officer: _____

e. Provide the following as attachments for (x) Contractor and (y) Contractor's proposed subcontractors and suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid:

i. OSHA No. 500-Log and Summary of Occupational Injuries & Illnesses for the past five (5) years.
□ See Attachment(s) □ None

ii. List of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last five (5) years (indicate disposition as applicable).
□ See Attachment(s) □ None

iii. List of all safety citations or violations under any state all received within the last five (5) years (indicate disposition as applicable).
□ See Attachment(s) □ None

f. Provide the following for (x) Contractor and (y) Contractor's proposed subcontractors and suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid:

i. Workers' compensation Experience Modification Rate ("EMR") for the last five (5) years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

ii. Total Recordable Frequency Rate ("TRFR") for the last five (5) years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

iii. Total number of man-hours worked for the last five (5) Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

iv. Days Away From Work, Days of Restricted Work Activity or Job Transfer ("DART") incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last five (5) years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

I hereby certify that: (1) all the information submitted in this Qualifications Statement, including any attachments, is true to the best of my knowledge and belief; (2) I am authorized to sign this Qualifications Statement on behalf of the Contractor whose name appears in Question 1 above; and (3) if any of the information I have provided herein becomes inaccurate, prior to execution of any Project contract, I will immediately provide Owner with updated accurate information in writing.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 2023

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES: _____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Contractor Key Personnel).
3. Schedule C (Contractor Employees – Level of Training and Experience).
4. Schedule D (Contractor's Last Five (5) Completed Projects).
5. Schedule E (Surety/Bonding Companies Contractor Utilized in Past Five (5) Years).
6. Audited balance sheet for each of the last 3 years for Contractor.
7. Evidence of authority for individuals in Section 7 to bind organization to an agreement.
8. Resumes of officers and key individuals (including Safety Officer) of Contractor.
9. Required safety program submittals listed in Section 15(e).
10. Additional items as pertinent.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

THIS PAGE INTENTIONALLY LEFT BLANK

SCHEDULE B
CONTRACTOR KEY PERSONNEL

Title	Name
Officer in Charge	
Project Manager	
Project Superintendent	

THIS PAGE INTENTIONALLY LEFT BLANK

SCHEDULE C

CONTRACTOR EMPLOYEES – LEVEL OF TRAINING AND EXPERIENCE

Employee Name	Level of Training	Experience

THIS PAGE INTENTIONALLY LEFT BLANK

SCHEDULE D

CONTRACTOR'S LAST FIVE (5) COMPLETED PROJECTS

Project Name	Owner's Contact Person	Project Location and Description	Scheduled Completion Date	Final Completion Date	Owner-Approved Extension?
	Name: Address: Telephone:				
	Name: Address: Telephone:				
	Name: Address: Telephone:				
	Name: Address: Telephone:				
	Name: Address: Telephone:				

THIS PAGE INTENTIONALLY LEFT BLANK

SCHEDULE E

SURETY/BONDING COMPANIES CONTRACTOR UTILIZED IN PAST 5 YEARS

Name of Surety/Bonding Company	Agent's Name, Address, Phone Number

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 52 00
AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Metro Waste Authority ("Owner") and

_____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: Cell construction includes: Bulk excavation, hauling, placement and stockpiling of on-site soils; processing on-site borrow soils; construction of recompacted clay liner and geomembrane liner; geotextiles; granular soils; collection piping; construction of storm water conveyance and pollution prevention structures; fencing and gates, roadway construction and roadway surfacing, leachate collection improvements at the Greene County closed landfill including, but not limited to, excavation, trenching, HDPE pipe fusing and installation, access point riser installation, temporary leachate, stormwater, and groundwater management, lift station, flowmeter and meter manhole, gas collection infrastructure, electrical, sediment removal, topsoiling, seeding and fertilizing, and erosion controls; and the work required by the Drawings and Specifications.

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: P-64 Cell D Liner and Greene Co. Landfill Improvements.

ARTICLE 3 – ENGINEER

3.01 The part of the Project that pertains to the Work, and which is not designated as delegated design to be completed by the Contractor, has been designed by HDR Engineering, Inc. (Design Engineer). The Owner has retained HDR Engineering, Inc. to act as Owner's construction quality assurance consultant for the Project.

3.02 Both the Design Engineer and the construction quality assurance consultant ("Engineer") is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

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

4.02 *Contract Times: Dates*

A. The Work will be substantially completed on or before July 15, 2023, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before August 15, 2023.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner $2,000.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $1,100.00 for each day that expires after such time until the Work is completed and ready for final payment.

3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

A. For all Work other than Unit Price Work, a lump sum of: $[_____].

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item):

Lump Sum Work				
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Price**
101	Mobilization, demobilization, and all work not included in Bid Item Nos. 102 through 108	LS	1	
102	Construct Cell D Liner, and Leachate Collection System	LS	1	
103	Construct Greene Co. LF Improvements	LS	1	
104	Construct Perimeter Access Road Surfacing	LS	1	
109	Allowance (5% of Total Combined Price of Bid Items 101 – 108)	LS	1	

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
105	Bulk Excavation to Cell D and Perimeter Road Base Grade Elevations	CY	20,000		
106	Structural Fill to reach Cell D, Phase 2 Access Road, and Perimeter Road Base Grade Elevations	CY	11,760		
107	Remove and Replace Unsuitable Soils Below Base Grade (Cell D Liner System)	CY	1,000		
108	Seeding Disturbed Areas (Install Owner supplied amended topsoil. Install Seed, Fertilize, and Mulch)	AC	2.0		

Alternate Bid Item Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
A110	Bid Alternate Item A110 - Security Fencing and Gate	LF	2,500		
A111	Bid Alternate Item A111 – Phase 2 Access Road to Cell D Aggregate Surfacing	LS	1		
A112	Bid Alternate Item A112 – Tipping Pad Turnaround Area Aggregate Surfacing	LS	1		
A113	Bid Alternate Item A113 – MW-16 Electrical Line Renovations	LS	1		
A114	Bid Alternate Item A114 – Metering Manhole and Flowmeter	LS	1		
A115	Bid Alternate Item A115 – Cell B Sump Solar Panel Pump Unit	LS	1		
A116	Bid Alternate Item A116 – Greene Co. Gas Infrastructure Improvements	LS	1		
A117	Bid Alternate Item A117 – Excavation of Excess Soils to Building Pad Stockpile	CY	3,000		

Alternate Bid Item Nos. Selected [_____]. $[_____]

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

C. Total of Lump Sum Amount, Unit Price Work (subject to final Unit Price adjustment), and Alternate Bid Items selected $[_____].

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment each month, in accordance with Paragraph 15.01(D) of the General Conditions, during performance of the Work as provided in Paragraph 6.02.A.1 below and in accordance with Iowa Code Chapter 573, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract:

    a. Ninety-five (95) percent of Work completed (with the balance being retainage).; and

    b. Ninety-five (95) percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage)

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price in accordance with Iowa Code Chapter 573 and as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate in effect under Iowa Code section 12C.6, as of the day interest begins to accrue.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

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

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

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

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

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

E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

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

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

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

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

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 8, inclusive).
2. Performance bond (pages 1 to 3 inclusive).
3. Payment bond (pages 1 to 3 inclusive).
4. General Conditions (pages 1 to 65, inclusive).
5. Supplementary Conditions (pages 1 to 16, inclusive).
6. Specifications as listed in the table of contents of the Project Manual.
7. Drawings consisting of ___ sheets with each sheet bearing the following general title: ___.
8. Addenda (numbers ___ to ___, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid (pages ___ to ___, inclusive).
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.
    b. Work Change Directives.
    c. Change Orders.
    d. Field Orders.

B. The documents listed in Paragraph 9.01.A are NOT attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

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

10.02 *Assignment of Contract*

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

10.03 *Successors and Assigns*

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

10.04 *Severability*

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

10.05 *Contractor's Certifications*

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

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

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

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

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

10.06 *Other Provisions*

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

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

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

OWNER:	CONTRACTOR:
Metro Waste Authority	_____
By: _____	By: _____
Title: _____	Title: _____
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: _____	Attest: _____
Title: _____	Title: _____
Address for giving notices:	Address for giving notices:
Metro Waste Authority	_____
300 E Locust, Suite 100	_____
Des Moines, Iowa 50309	_____
	State Contractor's No.: _____

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

SECTION 00 61 00
PERFORMANCE BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

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

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and

resulting from the actions or failure to act of the Surety under Paragraph 5; and

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

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

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

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

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

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

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

14. Definitions

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

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

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

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

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

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

16. In accordance with Iowa Code section 573.6, the following provisions shall be held to be a part of this Bond:

16.1 The Contractor and Surety on this Bond hereby agree to pay all persons, firms or corporations having contracts directly with the Contractor or with subcontractors, all just claims due to them for labor performed or materials furnished, in the performance of the contract on account of which this Bond is given, when the same are not satisfied out of the portion of the contract price which the Owner is required to retain until completion of the public improvement, but the Contractor and Surety shall not be liable to said persons, firms, or corporations unless the claims of said claimants against said portion of the contract price shall have been established as provided by law.

16.2 The Surety shall be deemed and held, any contract to the contrary notwithstanding, to consent without notice: (a) to any extension of time to the Contractor in which to perform the contract; (b) to any change in the plans, specifications, or contract, when such change does not involve an increase of more than twenty five percent (25%) of the total contract price, and shall then be released only as to such excess increase; and (c) that no provision of this Bond or of any other contract

shall be valid which limits to less than one (1) year from the time of the acceptance of the work the right to sue on this Bond for defects in the quality of the work or material not discovered or known to the oblige at the time such work was accepted.

17. This Bond shall be governed in accordance with the laws of the State of Iowa.

18. Modifications to this Bond are as follows:

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

SECTION 00 61 50
PAYMENT BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

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

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 20

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

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

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

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

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

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

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

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

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

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

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

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

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

    7.2 Pay or arrange for payment of any undisputed amounts.

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

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

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

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

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

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

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

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

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

16. **Definitions**

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

1. The name of the Claimant;

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

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

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

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

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

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

18. In accordance with Iowa Code section 573.6, the following provisions shall be held to be a part of this Bond:

18.1 The Contractor and Surety on this Bond hereby agree to pay all persons, firms or corporations having contracts directly with the Contractor or with subcontractors, all just claims due to them for labor performed or materials furnished, in the performance of the contract on account of which this Bond is given, when the same are not satisfied out of the portion of the contract price which the Owner is required to retain until completion of the public improvement, but the Contractor and Surety shall not be liable to said persons, firms, or corporations unless the claims of said claimants against said portion of the contract price shall have been established as provided by law.

18.2 The Surety shall be deemed and held, any contract to the contrary notwithstanding, to consent without notice: (a) to any extension of time to the Contractor in which to perform the contract; (b) to any change in the plans, specifications, or contract, when such change does not involve an increase of more than twenty five percent (25%) of the total contract price, and shall then be released only as to such excess increase; and (c) that no provision of this Bond or of any other contract shall be valid

which limits to less than one (1) year from the time of the acceptance of the work the right to sue on this Bond for defects in the quality of the work or material not discovered or known to the oblige at the time such work was accepted.

19. This Bond shall be governed in accordance with the laws of the State of Iowa.

20. Modifications to this Bond are as follows:

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Contractor's Application for Payment No.

To (Owner):	Application Period:	Application Date:
	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

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

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;
(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest, or encumbrances); and
(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

MWA Acct. Code: _____

Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period				
	Totals							

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

A					B	C	D	E	F		
Item		Contract Information									
Bid Item No.	Description	Item Quantity	Units	Unit Price	Total Value of Item ($)	Estimated Quantity Installed	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
	Totals										

Stored Material Summary

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

Request for Information Form

Contractor's RFI No. _____ Engineer's RFI No. _____

Contract: _____

Contractor: _____

Owner: Metro Waste Authority Owner's Contract No. P-64

Engineer HDR Engineering, Inc. Engineer's Contract No. 10359069

THIS REQUEST BY:____ cc to:_____
(Name of the Contractor's Representative)

REFERENCE: DIVISION _____ SECTION _____ PLAN SHEET NO. _____

_____

_____

_____

_____

_____

ATTACHMENTS _____

INTERPRETATION BY: _____Date:_____, 20___
(Name of the Engineer's Representative)

_____

_____

_____

_____

_____

ATTACHMENTS_____

The General Conditions specifies that once the Engineer provides a response to a Contractor's RFI, that determination shall be final and binding on the Contractor unless the Contractor delivers to the Owner written notice of a change in the work within a certain period of time of receipt of that determination. See the GCs for further clarification.

cc to: _____

_____

THIS PAGE INTENTIONALLY LEFT BLANK

Field Order No. __

Project Name:	P-64 Cell D Liner and Greene Co. LF Improvements	Owner's Project No. (if applicable):	P-64
Project Owner:	Metro Waste Authority	Regulatory Agency Project No. (if applicable):	N/A
HDR Project No.:	10359069	Date:	

Attention:
You are hereby directed to promptly execute this Field Order for minor changes in work without changes in Contract Sum or Contract Time.

If you consider that a change in Contract Sum or Contract Time is required, please submit your itemized proposal to HDR immediately and before proceeding with this work. If your proposal is found to be acceptable and in proper order, this Field Order will in that event be superseded by a Change Order.

Reference:

Receipt Acknowledged: General Contractor

By: HDR Engineering, Inc.

Date

Date

THIS PAGE INTENTIONALLY LEFT BLANK

Work Change Direction No. __

Date of Issuance:		Effective Date:	Immediately Upon Issuance
Owner:	Metro Waste Authority	Owner's Contract No.:	P-64
Contractor:		Contractor's Project No.:	
Engineer:	HDR Engineering, Inc.	Engineer's Project No.:	10359069
Project:	P-64 Cell D Liner & Greene Co. LF Improvements	Contract Name:	Same as project

Contractor is directed to proceed promptly with the following change(s):

Attachments: None.

Purpose for Work Change Directive:
Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: *[check one or both of the following]*

☐ Non-agreement on pricing of proposed change.
☐ Necessity to proceed for schedule or other Project reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price $ [increase] / [decrease].

Contract Time days [increase] / [decrease].

Basis of estimated change in Contract Price:
☐ Lump Sum ☐ Unit Price
☐ Cost of the Work ☐ Other

RECOMMENDED:	AUTHORIZED BY:	RECEIVED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title:	Title:	Title:
Date:	Date:	Date:

Change Proposal Request No. __

Date of Initiation:		Initiated By:	
Owner:	Metro Waste Authority	Owner's Contract No.:	P-64
Contractor:		Contractor's Project No.:	
Engineer:	HDR Engineering, Inc.	Engineer's Project No.:	10359069
Project:	P-64 Cell D Liner & Greene Co. LF Improvements	Contract Name:	Same as project

The following change in the contract for this project is proposed. A breakdown of cost shall be attached and no work shall be commenced until authorized by the Owner.

1. Description of the Proposed Change(s):
2.

By:

All work shall be in accordance with the terms, stipulations, and conditions of the original Contract Documents. If the work herein provided for is approved by Change Order, the change in Contract Price and Contract Time will be:

Contract Price $ [increase] / [decrease].

Contract Time days [increase] / [decrease].

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price

☐ Cost of the Work ☐ Other

Proposed By:	Engineer Recommendation	Owner's Action
Ryan Incorporated Central	☐ Recommend Acceptance ☐ Do Not Recommend Acceptance	☐ Accepted ☐ Not Accepted
By: Contractor	By: HDR Engineering, Inc.	By: Owner
Date	Date	Date

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives*:

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

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

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

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

2.02 *Copies of Documents*

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

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

2.03 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.05 *Initial Acceptance of Schedules*

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

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

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

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

2.06 *Electronic Transmittals*

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

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

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

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

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

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

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

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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

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

B. *Resolving Discrepancies*:

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

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

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

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

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

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

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

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

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

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

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

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

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

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

4.05 *Delays in Contractor's Progress*

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

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

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

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

2. abnormal weather conditions;

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

4. acts of war or terrorism.

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

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

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

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

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

5.01 *Availability of Lands*

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

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

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

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

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

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

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

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

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

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

5.03 *Subsurface and Physical Conditions*

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

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

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

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

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

5.04 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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

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

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

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

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

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

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

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

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

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

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

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

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

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

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

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

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

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

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

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

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

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

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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

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

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

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

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

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

6.02 *Insurance—General Provisions*

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

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

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

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

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

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

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

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

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

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

6.03 *Contractor's Insurance*

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

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

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

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

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

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

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

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

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

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

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

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

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

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

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

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

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

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

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

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

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

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

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

6.04 *Owner's Liability Insurance*

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

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

6.05 *Property Insurance*

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

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

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

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

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

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
6. extend to cover damage or loss to insured property while in transit.
7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
8. allow for the waiver of the insurer's subrogation rights, as set forth below.
9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
10. not include a co-insurance clause.
11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
12. include performance/hot testing and start-up.
13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

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

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

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

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

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

6.06 *Waiver of Rights*

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

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

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

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

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

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

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

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

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

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

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

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

7.02 *Labor; Working Hours*

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

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

7.03 *Services, Materials, and Equipment*

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

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

7.04 *"Or Equals"*

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

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

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

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

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

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

4) it is not objectionable to Owner.

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

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

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

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

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

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

7.05 *Substitutes*

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

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

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

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:

1) all variations of the proposed substitute item from that specified, and

2) available engineering, sales, maintenance, repair, and replacement services.

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

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

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

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

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

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

7.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

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

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

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

7.08 *Permits*

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

7.09 *Taxes*

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

7.10 *Laws and Regulations*

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

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

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

7.11 *Record Documents*

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

7.12 *Safety and Protection*

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

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

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

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

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

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

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

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

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

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

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

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

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

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

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

   a. Contractor shall submit the number of Samples required in the Specifications.

   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

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

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

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

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

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

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

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

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

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

E. *Resubmittal Procedures*:

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

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

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

7.17 *Contractor's General Warranty and Guarantee*

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

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

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

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

7.18 *Indemnification*

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

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

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

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

7.19 *Delegation of Professional Design Services*

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

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

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

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

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

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

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

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

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

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

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

8.02 *Coordination*

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

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

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

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

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

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

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

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

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

10.04 *Rejecting Defective Work*

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

10.05 *Shop Drawings, Change Orders and Payments*

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

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

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

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

10.06 *Determinations for Unit Price Work*

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

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

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

10.08 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

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

10.09 *Compliance with Safety Program*

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

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

11.01 *Amending and Supplementing Contract Documents*

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

1. *Change Orders*:

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

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

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

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

11.02 *Owner-Authorized Changes in the Work*

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

11.03 *Unauthorized Changes in the Work*

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

11.04 *Change of Contract Price*

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

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

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

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

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

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

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

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

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

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

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

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

11.05 *Change of Contract Times*

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

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

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

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

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

11.07 *Execution of Change Orders*

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

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

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

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

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

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

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

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

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

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

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

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

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

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

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

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

13.01 *Cost of the Work*

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

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

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

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

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

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

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

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

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

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

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

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

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

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

13.02 *Allowances*

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

B. *Cash Allowances*: Contractor agrees that:

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

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

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

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

13.03 *Unit Price Work*

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

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

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

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

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

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

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

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

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

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

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

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

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

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

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

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

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

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

14.04 *Acceptance of Defective Work*

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

14.05 *Uncovering Work*

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

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

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

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

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

14.06 *Owner May Stop the Work*

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

14.07 *Owner May Correct Defective Work*

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

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

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

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

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

15.01 *Progress Payments*

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

B. *Applications for Payments*:

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

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

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

C. *Review of Applications*:

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

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

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

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

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

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

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

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

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

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

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

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

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

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

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

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

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

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

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

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

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

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

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

15.04 *Partial Use or Occupancy*

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

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

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

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

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

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

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

B. *Engineer's Review of Application and Acceptance*:

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

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

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

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

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 00 80 00
SUPPLEMENTARY CONDITIONS

1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

SC-1.01

Add to the list of definitions in Paragraph 1.01.A by inserting the following as numbered items in their proper alphabetical positions:

> Geotechnical Baseline Report (GBR) - The interpretive report prepared by or for Owner regarding subsurface conditions at the Site and containing specific baseline geotechnical conditions that may be anticipated or relied upon for bidding and contract administration purposes, subject to the controlling provisions of the Contract, including the GBR's own terms. The GBR is a Contract Document.
>
> Geotechnical Data Report (GDR) - The factual report that collects and presents data regarding actual subsurface conditions at or adjacent to the Site, including Technical Data and other geotechnical data, prepared by or for Owner in support of the Geotechnical Baseline Report. The GDR's content may include logs of borings, trenches, and other site investigations, recorded measurements of subsurface water levels, the results of field and laboratory testing, and descriptions of the investigative and testing programs. The GDR does not include an interpretation of the data. If opinions, or interpretive or speculative non-factual comments or statements appear in a document that is labeled a GDR, such opinions, comments, or statements are not operative parts of the GDR and do not have contractual standing. Subject to that exception, the GDR is a Contract Document.

SC-1.01.A

Add the following sentence to the end of Paragraph GC-1.01.A:

> "When used in a context consistent with the definition of a listed-defined term, the term shall have a meaning as defined below whether capitalized or italicized or otherwise."

SC-1.01.A.20

Replace paragraph GC-1.01.A.20 with the following paragraph:

> Engineer – The individual or entity named as such in the Agreement with respect to the design of the Project; however with respect to rights, responsibilities and authorities assigned to "Engineer" in the Contract Documents, the word Engineer shall be read as "Engineer and/or Owner's Construction Quality Assurance Consultant." Upon Award of Contract, Owner shall provide a clarification to the Contractor defining (if any) the division of rights, responsibilities and authorities of the Engineer and the Owner's Construction Quality Assurance Consultant.

2 – PRELIMINARY MATTERS

SC-2.04 Preconstruction Conference; Designation of Authorized Representatives

SC-2.04.A Modify paragraph GC-2.06A. by adding the following phrase after the word "started":

"(except with approval of the Owner)"

3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01 Intent

SC-3.01.F

Add the following new paragraphs immediately after Paragraph 3.01.E:

F. The Specifications may vary in form, format and style. Some Specifications sections are written in varying degrees of streamlined or declarative style and some sections may be relatively narrative by comparison. Omissions of such words and phrases as "the Contractor shall," "in conformity with," "as shown," or "as specified" are intentional in streamlined sections. Omitted words and phrases shall be supplied by inference. Similar types of provisions may appear in various parts of a section or articles within a part depending on the format of the section. The Contractor shall not take advantage of any variation of form, format or style in making claims for extra Work.

G. The cross referencing of Specifications sections under the subparagraph heading "Related Sections include but are not necessarily limited to:" and elsewhere within each Specifications section is provided as an aid and convenience to the Contractor. The Contractor shall not rely on the cross referencing provided and shall be responsible to coordinate the entire Work under the Contract Documents and provide a complete Project whether or not the cross referencing is provided in each section or whether or not the cross referencing is complete.

F. The Construction Documents, and the Project to be constructed in accordance with the Construction Documents, are subject to the provisions and requirements of Iowa Code Chapter 573.

4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.03 Reference Points

SC-4.03.B

Add the following paragraph immediately after Paragraph GC-4.03.A:

B. Contractor shall engage, at Contractor's expense, a registered professional engineer or licensed land surveyor to give Contractor lines and elevations for Contractor's use in constructing the Work. The registered engineer or licensed land surveyor shall furnish to Engineer, through Contractor, a signed plat certifying the location and elevation of the Work indicating ties and closure to reference points established by the Owner and indicated on the Drawings.

SC-4.05.H

Add the following paragraphs immediately after paragraph GC-4.05.G:

H. No extension of the Contract Time will be allowed for additional Work or for claimed delay unless the additional Work contemplated or claimed delay is shown to be on the critical path of the Project's schedule of construction or Contractor can show by critical path method analysis how the additional Work on claimed delay adversely affects the critical path.

I. Time extensions will not be granted for rain, wind, flood, or other natural phenomena of normal intensity for the locality where Work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for a minimum continuous period of at least one-fourth of the Contract Time involved with the average of the preceding 5-year climatic range during the same time interval based on U.S. Weather Bureau statistics for the locality where the Work is performed.

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

SC-5.03 Subsurface and Physical Conditions

SC-5.03.C

Add the following new paragraphs immediately after Paragraph 5.03.B:

C. Other drawings that were not included with the Bidding Documents are available for examination at the HDR office at 300 East Locust Street, Suite 210 Des Moines, IA 50309 during regular business hours. Those not furnished with the Bidding Documents are available upon request for the cost of reproduction of $0.20 per page plus express shipping.

SC-5.06.A.3

Add the following new subparagraphs immediately after Paragraph 5.06.A.2:

3 Reports and other drawings that were not included with the Bidding Documents are available for examination at the HDR office during regular business hours. Those not furnished with the Bidding Documents are available upon request for the cost of reproduction of $0.20 per page plus express shipping.

6 – BONDS AND INSURANCE

SC-6.02 Insurance—General Provisions

SC-6.02.B.1

Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the State of Iowa within the last 12 months.

SC-6.03 Contractor's Insurance

SC 6.03.C

Delete Paragraph 6.03.C in its entirety and replace it with the following:

C. *Commercial General Liability—Forms and Content:* Contractor's commercial liability policy shall be written on a 2007 (or newer) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

SC 6.03.C.1.a

Delete Paragraph 6.03.C.1.a in its entirety and replace the same with the following:

a. Such insurance shall be maintained for 10 years after final payment.

SC 6.03.C.9

Add the following paragraph immediately after Paragraph 6.03.C.8:

9. Per Project Aggregate.

SC 6.03.I.3

Delete Paragraph 6.03.I.3 in its entirety and replace it with the following:

3. contain a provision or endorsement that the coverage afforded will not be canceled or renewal refused until at least 30 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

SC 6.03.K

Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:		Statutory
Federal, if applicable (e.g., Longshoreman's):		Statutory
Jones Act coverage, if applicable:		
Bodily injury by accident, each accident	$	N/A

Bodily injury by disease, aggregate	$	N/A

Employer's Liability:

Bodily injury, each accident	$	500,000
Bodily injury by disease, each employee	$	500,000
Bodily injury/disease aggregate	$	500,000

For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	$	N/A
Foreign voluntary worker compensation		Statutory

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate	$	2,000,000
Products - Completed Operations Aggregate	$	2,000,000
Personal and Advertising Injury	$	1,000,000
Each Occurrence (Bodily Injury and Property Damage)	$	1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Combined Single Limit of	$	1,000,000

4. Excess or Umbrella Liability:

Per Occurrence	$	5,000,000
General Aggregate	$	5,000,000

5. Contractor's Pollution Liability:

Each Occurrence	$	1,000,000
General Aggregate	$	3,000,000

☐ If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following: None.

7. Contractor's Professional Liability:

Each Claim	$ 1,000,000
Annual Aggregate	$ 1,000,000

SC-6.05 Property Insurance

SC-6.05.A.14

Add the following to the list of requirements in Paragraph 6.05.A, as a numbered item:

14. be subject to a deductible amount of no more than $25,000 for direct physical loss in any one occurrence.

SC-6.05.A.1.a

Add the following new subparagraph after subparagraph 6.05.A.1:

a. In addition to Owner, Contractor, and all Subcontractors, include as insureds the names of Engineer, Owner's Construction Quality Assurance Consultant and each of their respective subconsultants, who will be identified upon Award of Contract, as their interests may appear, including their respective officers, directors, agents, and employees.

SC-6.05.A.15

Add the following to the list of items in Paragraph 6.05.A, as numbered items:

15. include for the benefit of Owner loss of profits and soft cost coverage including, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, plus attorneys' fees and engineering or other consultants' fees, if not otherwise covered;

16. include by express endorsement coverage of damage to Contractor's equipment.

7 – CONTRACTOR'S RESPONSIBILITIES

SC-7.01 Supervision and Superintendence

SC-7.01.B

Add the following sentence to the end of Paragraph 7.01.B:

"The Contractor shall identify its representative at the Site that shall have authority to act on behalf of Contractor. All communications given to or received from this representative shall be binding on Contractor."

SC-7.01.C

Add the following new paragraph immediately after Paragraph 7.01.B:

C. Any superintendent or other personnel, who repeatedly fails to follow the Engineer's written or oral orders, directions, instructions, or determinations, shall be subject to removal from the project. Upon the written request of the Owner, the Contractor shall immediately remove such superintendent or other personnel and name a replacement in writing. Noncompliance with the Owner's request to remove and replace personnel at any level shall be grounds for terminating the Contract.

SC-7.02 Labor; Working Hours

SC-7.02.B

Delete Paragraph 7.02 B. in its entirety, and insert the following:

B. In the absence of any Laws or Regulations to the contrary or other stipulations in the Contract Documents, Contractor may perform the Work on holidays, during any or all hours of the day, and on any or all days of the week, at Contractor's sole discretion.

SC-7.02.C

Add the following new paragraph immediately after Paragraph 7.02.B:

C. Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day.

SC-7.02.C.1

Add the following new subparagraph immediately after Paragraph 7.02.C:

1. For purposes of administering the foregoing requirement, additional overtime costs are defined as exceeding 60 hours of active Work during any given week of construction. The hourly cost of the Resident Project Representative is $120 per hour.

SC-7.03 Services, Materials, and Equipment

SC-7.03.A

Add the following new sentence at the end of paragraph GC-7.03.A:

"All items of standard equipment shall be the latest model at the time of delivery, unless otherwise specified."

SC-7.03.B

Add the following new subparagraphs immediately after Paragraph 7.03.B:

1. Where the Work requires equipment be furnished, due to the lack of standardization of equipment as produced by the various manufacturers, it may become necessary to make minor modifications in the structures, buildings, piping, mechanical work, electrical work, accessories, controls, or other work, to accommodate the particular equipment offered. Contractor's bid price for any equipment offered shall include the cost of making any necessary changes subject to the approval of Engineer.

SC-7.08 Permits

SC-7.08.B

Add a new paragraph immediately after Paragraph 7.08A:

B. In those instances where a certificate of occupancy must be obtained before the Work under this Contract can be occupied and placed into service by Owner, it shall be the responsibility of Contractor to arrange, coordinate, and pay any costs of obtaining said certificate.

SC-7.09 Taxes

SC 7.09.B

Add a new paragraph immediately after Paragraph 7.09.A:

B. Owner is exempt from payment of sales and compensating use taxes of the State of *Iowa* and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-7.11 Record Documents

SC-7.11.B

Add the following new paragraphs at the end of paragraph 7.11.A:

B. Contractor's licensed land surveyor or registered engineer shall confirm all control points identified on the Contract Documents for record document purposes and for purposes of measurement and payment for unit price items. Contractor's record documents shall include certification, by the Contractor's licensed land surveyor or registered engineer, of the final as-constructed geometry of the Project.

1. Owner, at Owner's discretion, may employ the services of a quality assurance surveyor to check the accuracy of Contractor's survey.

2. In the event there is any discrepancy between Contractor's surveys and Owner's quality assurance surveys, a third independent reconciling survey by a licensed land surveyor, mutually acceptable to both of the Contractor and Owner shall be performed to reconcile the discrepancy. The cost of such additional survey shall be borne by the party whose initial survey is at greater deviation from the reconciling survey.

C. Contractor shall update the onsite record drawings on a weekly basis, or more frequently.

SC-7.12 Safety and Protection

SC-7.12.C Insert the following after the first sentence of Paragraph 7.12.C:

"The following Owner safety programs are applicable to the Site:

1. Metro Waste Authority Safety and Health Rules for Outside Contractors;
2. Metro Waste Authority Contractor Orientation Written Program; and
3. Metro Waste Authority Contractor Safety Declaration."

SC-7.16.A.3

Add the following new sentence and paragraph at the end of paragraph 7.16.A.3:

", otherwise, Contractor will not be relieved of the responsibility of executing the Work in accordance with the Contract Documents, even though such Shop Drawings or Samples have been otherwise reviewed.

a. If a Shop Drawing or Sample, as submitted, indicates a variation from the Contract requirements as set forth in the Contract Documents and Engineer finds same to be in the interest of Owner and to be so minor as not to involve a change in the Contract Price or time for performance, Engineer may approve the Shop Drawings or Samples; provided however, such departure is slight in nature and does not affect the design concept of the Work."

Add the following paragraphs at the end of paragraph GC-7.16.A.3:

4. Contractor shall submit all Shop Drawings and Samples sufficiently in advance of construction requirements to allow ample time for checking, correcting, resubmitting and rechecking and to avoid any delay in progress of the Work.

5. Shop Drawings and Sample submittals not conforming to requirements of the Contract Documents will be returned to Contractor without action for resubmittal and the resulting delay shall be entirely the responsibility of Contractor.

SC-7.16.D.1

Modify the first sentence of GC-7.16.D.1 by deleting the following word after the word "provide":

"timely"

SC-7.16.E.4

Add the following paragraph immediately after paragraph GC-6.17.E.3:

4. Engineer's check and review of Shop Drawings and Samples, standard specifications and descriptive literature submitted by Contractor will be only for general conformance with design concept, except as otherwise provided, and shall not be construed as:

   a. permitting any departure from the Contract requirements;

   b. relieving Contractor of the responsibility for any error in details, dimensions or otherwise that may exist in such submittals;

   c. constituting a blanket approval of dimensions, quantities, or details of the material or equipment shown; or

   d. approving departures from additional details or instructions previously furnished by Engineer. Such check or review shall not relieve Contractor of the full responsibility of meeting all of the requirements of the Contract Documents.

SC-7.18 Indemnification

SC 7.18.A

Amend Paragraph 7.18.A by deleting the following:

"negligent".

9 – OWNER'S RESPONSIBILITIES

SC-9.07 Change Orders

SC-9.07.A

Modify Paragraph GC-9.07A. by adding the following sentence at the end of the first sentence:

Contractor shall, at Contractor's own expense, provide help and other assistance as may be required for making measurements of Unit Price Work.

10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

SC-10.03

Add the following paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.
2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare documentation of such meetings as requested by Engineer.
4. Liaison:
   a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
   b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
   c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed.
6. Shop Drawings and Samples:
   a. Record date of receipt of Samples and Contractor-approved Shop Drawings.

b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

7. Review of Work and Rejection of Defective Work:

a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

8. Inspections, Tests, and System Start-ups:

a. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

9. Records:

a. Maintain records for use in preparing Project documentation.

10. Reports:

a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule.

11. Payment Requests: Assist the Engineer in the review of applications for payment with Contractor for the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

12. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

13. Completion:

a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and in preparation of a final punch list of items to be completed and deficiencies to be remedied.

c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or any failure of the Contractor to comply with Laws and Regulations applicable to the Contractor's performance of the work.

5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.

8. Authorize Owner to occupy the Project in whole or in part.

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

SC-13.03 Unit Price Work

SC-13.03.B

Add the following sentence immediately at the end of Paragraph 13.03.B:

"Progress estimates serve only as basis for partial payments. The Engineer may revise progress estimates and/or quantities any time before final acceptance. If the Engineer deems it proper to do so, changes may be made in progress estimates and in the final estimate."

SC-13.03.C.

Add the following sentence immediately at the end of Paragraph 13.03.C:

"Work described in the Contract Documents, or reasonably inferred as required for a functionally complete installation, but not identified in the listing of unit price items, shall be considered incidental to unit price work listed and the cost of incidental work included as a part of the unit price."

SC 13.03.E

Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the extended price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.

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

SC-15.01 Progress Payments

SC-15.01.B.1

Delete the first sentence of Paragraph 15.01.B.1 in its entirety and insert the following in its place:

1. By the 10th day of each month, Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

SC-15.01.D

Delete Paragraph 15.01.D in its entirety and insert the following in its place:

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

SC-15.03 Substantial Completion

SC 15.03.B.1

Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-15.06 Final Payment

SC-15.06.D.

Delete Paragraph 15.06.D in its entirety and insert the following in its place:

D. *Payment Becomes Due*: The Engineer shall present to Owner the final Application for Payment and accompanying documentation. Subject to the provisions of Iowa Code Chapter 573 and as hereinafter provided in this Paragraph 15.06.D, 30 days after the last to occur of (i) the completion of the Work and (ii) final acceptance of the Work by Owner, the amount recommended by Engineer in the final Application for Payment (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages, set-offs allowed under the provisions above with respect to progress payments, set-offs for claims on file with Owner for material and/or labor in accordance with Iowa Code Chapter 573, as more specifically addressed in Paragraph 15.06.D.1 below) will become due and shall be paid by Owner to Contractor.

1. *Claims for Materials and/or Labor*. In accordance with Iowa Code Chapter 573, if at the end of the above-referenced 30-day period claims are on file with the Owner for materials and/or labor, Owner shall continue to retain from the unpaid funds a sum equal to double the total amount of all claims on file. The remaining balance of the unpaid funds shall be released and paid to Contractor.

2. *Interest*.

   a. In accordance with Iowa Code Chapter 573 and subject to the provisions therein, failure to make payment of any amount due to Contractor within 50 days after the last to occur of (i) the completion of the Work and (ii) final acceptance of the Work by Owner, shall cause interest to accrue on the amount unpaid to the benefit of the unpaid party.

   b. Interest shall accrue during the period commencing the 31st day following the last to occur of (i) the completion of the Work and (ii) final acceptance of the Work by Owner, and ending on the date of payment.

   c. The rate of interest shall be determined by the period of time during which interest accrues, and shall be the same as the rate of interest that is in effect under Iowa Code Section 12C.6, as of the day interest begins to accrue, for a deposit of public funds for a comparable period of time. Except as provided in Iowa Code Sections 573.12 and 573.16, interest shall not accrue on funds retained by Owner to satisfy claims for material and/or labor on file with Owner.

3. *Exception*. In accordance with Iowa Code Chapter 573, no part of the unpaid fund due to Contractor shall be retained, as provided in Iowa Code Chapter 573, on claims for materials furnished, other than materials ordered by the Contractor or Contractor's authorized agent, unless such claims are supported by a certified statement that the Contractor had been notified within 30 days after the materials were furnished or by itemized invoices rendered to Contractor during the progress of the Work, of the amount, kind and value of the material furnished.

SC-15.07 Waiver of Claims

SC-15.07.B.

Delete Paragraph 15.07.B in its entirety and insert the following in its place:

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

16 – SUSPENSION OF WORK AND TERMINATION

SC-16.02 Owner May Terminate for Cause

SC-16.02.H.

Add the following paragraphs immediately after paragraph 16.02.G:

H. Neither Owner, Engineer, nor any of their respective consultants, agents, officers, directors or employees shall be in any way liable or accountable to Contractor or Surety for the method by which the completion of the Work, or any portion thereof, may be accomplished or for the price paid therefore.

I. Maintenance of the Work shall continue to be Contractor's and Surety's responsibilities as provided for in the bond requirements of the Contract Documents or any special guarantees provided for under the Contract Documents or any other obligations otherwise prescribed by

law.

17 – FINAL RESOLUTION OF DISPUTES

SC-17.02 Arbitration

SC-17.02

Add the following new paragraph immediately after Paragraph 17.01.

17.02 *Arbitration*

A. All disputes arising under this Article shall be resolved through arbitration. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. Each party to the Contract Documents may initiate arbitration by serving a written notice upon the adverse party(s) stating as simply as possible the points of difference between the parties and stating an intent to initiate arbitration procedures. A copy of such written notice shall be sent to the Engineer at the same time. The written notice shall be deemed initiation of arbitration procedures. The demand for arbitration will be made within the specific time required in this Article, or if no specified time is applicable within a reasonable time after the matter in question has arisen. In no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.

C. Within ten (10) days thereafter, the parties shall meet and select an arbitrator. If the parties cannot agree on an arbitrator, Contractor shall have the right to select an arbitrator from a list of five (5) arbitrators submitted by Owner. Each of the five arbitrators submitted shall be a retired Iowa district court judge or Iowa appellate court justice. The arbitration hearing shall be held within thirty (30) days of the selection of the arbitrator. The hearing shall be conducted informally.

D. No arbitration arising out of or relating to the Contract shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.

E. The decision shall be reduced to writing and submitted in writing and the determination so made shall be binding upon the parties and shall form the basis for future guidance of all parties on the issues so resolved. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties and include a concise breakdown of the award, and a written explanation of the award specifically citing the Contract provisions deemed applicable and relied on in making the award.

F. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.

G. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor. Each party shall pay for its own witness costs.

H. The arbitration shall be conducted under the Iowa Rules of Civil Procedure.

SC-17.03 Attorneys' Fees

SC-17.03

Add the following new paragraph immediately after Paragraph 17.02:

2. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

END OF SECTION

DIVISION 01

GENERAL REQUIREMENTS

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 11 00
SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. References.
2. Specification Formats and Conventions.
3. Work Covered by the Contract Documents.
4. Coordination with Existing Operations.
5. Work Sequence.
6. Use of Premises.
7. Work by Others.
8. Future Work.
9. Owner-Furnished Products.
10. Partial Owner Occupancy.
11. Project Utility Sources.
12. Miscellaneous Provisions.

B. Project Identification:
1. Project Location:
   a. Metro Park West Landfill, 2499 337th Street, Perry, Iowa.
2. Owner: Metro Waste Authority.
3. Work will be performed under the following Prime Contract: Contract P-64 – MPW Cell D Liner & Greene Co. LF Improvements.

1.2 REFERENCES

A. Definitions:
1. Basic Contract definitions and terminology are included in the General Conditions and Supplementary Conditions of the Contract.
2. The term "approved," when used to convey Engineer's action on Contractor's submittals, applications, and requests, is limited to Engineer's duties and responsibilities as stated in the General Conditions of the Contract.
3. The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

B. Industry Standards:
1. Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
2. Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
3. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
4. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements.

5. Each Section of the Specifications generally includes a list of reference standards normally referred to in that respective Section. The purpose of this list is to furnish the Contractor with a list of standards normally used for outlining the quality control desired on the project. The lists are not intended to be complete or all inclusive, but only a general reference of standards that are regularly referred to.
6. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

1.3 SPECIFICATION FORMATS AND CONVENTIONS

A. The Specifications are organized into Divisions and Sections using the 48 Division Format and CSI's "MasterFormat" numbering system.

B. The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

1.4 WORK COVERED BY THE CONTRACT DOCUMENTS

A. Project Identification: P-64 – MPW Cell D Liner & Greene Co. LF Improvements.

B. The Work of this Contract under the Base Bid generally includes the following:
   1. Cell D Liner Development:
      a. Site preparation, stripping vegetation, clearing, and grubbing.
      b. General earthwork including bulk soil excavation and processing, trenching, backfilling, embankment, and compacting.
      c. Soil stockpiling (temporary and permanent, grading).
      d. Excavation and placement of structural fill to reach Base Grades.
      e. Recompacted clay liner.
      f. 60 MIL HDPE geomembrane.
      g. Geotextiles (8 and 12 OZ).
      h. Drainage layer.
      i. Coarse aggregate for leachate trenches.
      j. Solid wall and perforated PVC leachate collection lines and cleanout risers.
      k. Termination berms on the east and south.
      l. Drainage layer separation, moisture control, and replacement, as well as wetting in support of electrostatic leak location testing.
      m. 12 MIL scrim-reinforced HDPE membrane rain cover and ballasting.
      n. Erosion controls, storm water pollution prevention, stormwater, groundwater, and leachate management.
      o. Fencing and gates.
      p. Miscellaneous structures and appurtenances.
      q. Contractor’s Health and Safety Plan development and implementation.
      r. Traffic and access controls.
      s. Closeout documentation.
      t. Others: See Drawings and Specifications.
   2. Greene Co. Landfill Improvements:
      a. Site preparation.
      b. General earthwork including bulk excavation and stockpiling, trenching, processing, backfilling, embankment, and compacting.
      c. Temporary leachate management.
      d. Temporary groundwater and stormwater management.
      e. HDPE dual-contained pipe installation.
      f. HDPE pipe fusing and installation.

g. HDPE pipe cleanouts.
h. HDPE access riser installation.
i. Sump lift station.
j. Aggregate backfill.
k. Pump installation and startup.
l. Flowmeter and meter vault installation.
m. Gas collection infrastructure, HDPE lateral piping, condensate sump.
n. Electrical, SCH 80 PVC conduit.
o. Topsoiling, finish grading, seeding, and fertilizer.
p. Erosion controls and storm water pollution prevention.
q. Miscellaneous structures and appurtenances.
r. Contractor's Health and Safety Plan development and implementation.
s. Traffic and access controls.
t. Closeout documentation.
u. Others: See Drawings and Specifications.

1.5 COORDINATION WITH EXISTING OPERATIONS

A. Site Access:
1. Existing site access roads shown on the Drawings shall not be obstructed by Contractor or Work unless specifically indicated on the Drawings.
2. Where roadway crossings are indicated, plan and sequence work to provide Owner uninterrupted use of the existing roadways.
3. Where designated access roads to specific construction areas are not shown on the Drawings, Contractor shall coordinate planned access routes with Owner and Engineer at the pre-construction conference.
4. Mark, rope off, barricade or otherwise protect all work in progress.

B. Drainage:
1. Where earthwork disturbs existing drainage patterns, plan work to ensure continuous proper drainage.

C. Vegetation:
1. Do not disturb vegetation outside the designated limits of construction.
2. Restore all disturbed vegetation to pre-construction conditions.

1.6 WORK SEQUENCE

A. Work Plan:
1. Contractor shall submit a Work Plan including project schedules, sequencing and other conditions and procedures to the Owner and Engineer and obtain such approvals a minimum of 2 weeks prior to beginning to undertake the Work.

B. Work will require sequencing priorities to include, but not necessarily limited to:
1. Cell D Development & Greene Co. Improvements shall be first priority.
2. Installation of grassing and erosion stabilization materials shall be established based on specified timeframes for seeding.

C. Roadways:
1. Where work is completed during active site hours on other Access Roads and has the potential to restrict traffic flow, plan Work to ensure a minimum of one lane of roadway shall remain open to traffic at all times.
2. Maintain a minimum of one lane of access at all times for Owner soil haul roads.
3. Where Work has the potential to restrict or obstruct roadways:
a. Submit traffic control plan where crossing or excavation of existing roads is anticipated.
1) The plan shall show how the disruption to the road will be minimized, and how the duration of the disruption will be minimized.
2) Obtain Owner and Engineer approval of the plan prior to this work.

b. Provide services of flagman and barricades at all one-lane access roadway locations, or as necessary during Owner's ongoing operating hours, designed as open for public use below.
    1) Flagman, signage and appropriate barricades will be a necessary part of any impacts or temporary obstructions of Main Access Roads during the hours stipulated above.

D. See Section 01 35 05 on leachate handling.

1.7 USE OF PREMISES

A. Contractor shall have use of the Owner's premises within the designated limits of construction for construction operations, including use of the Project Site, as allowed by law, ordinances, permits, easement agreements and the Contract Documents, except as noted herein.

B. Contractor's use of premises is limited by Owner's ongoing operations, right to perform work or to retain other contractors on portions of the Project.
1. Owner also anticipates using existing soil borrow operations east of the Cell D liner area. As such Contractor should anticipate requiring coordination of traffic with Owner earthwork equipment for safe operation.

C. Hours of Site Access:
1. The Site is open for public use as follows.
    a. Monday-Friday: 8:00 A.M. – 4:00 P.M.
    b. Saturday: Closed except for the first Saturday of every month: 9:00 A.M. – 12:00 P.M.
        1) 8:00 A.M. – 1:00 P.M. (November 1 – March 31).
    c. Sunday: Closed.
2. The Site is closed on the following holidays:
    a. Memorial Day.
    b. Independence Day.
    c. Labor Day.
    d. Thanksgiving Day.
    e. Christmas Day.
3. Contractor and all subcontractors and suppliers shall enter and exit through the main facility gate and stop at scale office to notify attendant upon entering.
4. If access is required beyond the public use hours, Contractor must inform the Owner's designated representative of the required hours of access and must make arrangements with the Owner to obtain such access. Contractor shall obtain prior written permission from the Owner for performing construction activities between the hours of 9:00 P.M. and 5:00 A.M. Monday – Saturday, Sunday operations, and holiday operations. Permission for site access beyond the public use hours will be at the Owner's option.
5. If Contractor is present on-site during non-public use hours, the site must be continually maintained secure from unauthorized access.
6. Contractor shall maintain a daily employee roster for all employees on-site and the daily roster shall be posted at the field office.

D. The Project Site is limited to boundaries indicated in the Contract Documents.

E. Provide protection and safekeeping of material and products stored on or off the premises.

F. Move any stored material or products that interfere with operations of Owner or other Contractors.

1.8 WORK BY OTHERS

A. Owner may perform certain construction operations which will be conducted at the Project Site simultaneously with Work under this Contract. The construction operations performed by the Owner and others include the following:
1. Earthwork and excavation for ongoing soil needed to undertake the operation of the landfill.

2. Ongoing operation of the existing landfill gas collection and control system, groundwater control system, leachate loadout area, and leachate evaporation system.

B. Cooperate fully with separate contractors and/or the Owner so work by others may be carried out smoothly, without interfering with or delaying work under this Contract.
   1. Owner will endeavor to dictate construction sequences that minimize impacts to Work under this Contract.
   2. Cooperate with other contractors or consultants, hired by the Owner, to allow access to areas required for their performance of work.
      a. Communicate with others performing work to avoid conflicts and identify areas of access.
      b. If conflicts are anticipated or identified immediately bring these to the attention of the Owner and Engineer's Resident Project Representative.

1.9 PROJECT UTILITY SOURCES

A. Metro Park West:
   1. Electrical: Midland Power Cooperative.
   2. Water: Xenia Rural Water District.

1.10 MISCELLANEOUS PROVISIONS

A. Contractor shall be responsible for negotiations of any waivers or alternate arrangements required to enable transportation of materials to the site.

B. Maintain conditions of existing access and haul roads on the site and adjacent facilities such that access is not hindered as the result of construction related activities or deterioration.

C. Contractor shall remove all wind or weather related litter (solid waste) that enters the project area at no additional cost to the Owner and shall ensure such materials are not incorporated into the Work.

D. The Contractor should anticipate up to five (5) days when the volume of wind or weather-related litter will prevent construction. Such days are defined in this paragraph. No extension of the number of calendar days for completion will be granted for the first five (5) such events. Such events must be documented and reported to the Engineer and the Owner immediately following the event. If the volume of windblown litter is such that a five person crew of the Contractor's employ cannot remove such material from the Work area in three hours the Owner will, upon the Contractor's request, remove such material and grant an extension of the number of calendar days for completion provided that such days exceed the five days stated above and provided these events and level of clean-up are properly documented and reported.

E. Contractor shall remove and replace existing fences within or adjacent to the Limits of Construction as construction needs dictate. If necessary, Contractor shall provide temporary lockable gate or other means to allow the site to be secured when Contractor is not present on site. Minimize time when litter fence is removed to minimize potential off-site litter problems. Restore or replace all removed fence to like new condition if removed or damaged during construction. Assist with clean-up of off-site litter to satisfaction of Owner when litter fence is removed.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 11 20
JOB CONDITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project phasing requirements.
   2. Job conditions.
   3. Site specific health and safety plan.
   4. Attachments:
      a. A - Contractor's Safety Rules.
      b. B - Contractor Orientation.
      c. C - Contractor Safety Declaration.

1.2 SUBMITTALS

A. Miscellaneous Submittals:
   1. Project schedule.
   2. Site specific health and safety plan (HASP).

1.3 ORDER OF CONSTRUCTION AND CONSTRUCTION SCHEDULE

A. Construction operations will be scheduled to allow the Owner uninterrupted operation of existing adjacent facilities.
   1. Coordinate connections with existing work to ensure timely completion of interfaced items.
   2. Contractor shall identify soil to be used for the recompacted clay liner construction (cell development) and shall construct any required test pads at the earliest possible time to allow hydraulic conductivity testing and establishment of an Acceptable Zone for moisture and density as it relates to minimum requirements for hydraulic conductivity as described in Specification Section 31 23 00.

B. At no time shall Contractor or his employees modify operation of the existing facilities or start construction modifications without approval of the Owner except in emergency to prevent or minimize damage.

C. Within 15 days after award of Contract, submit for approval a Gantt Bar chart baseline schedule.
   1. Account for schedule of Subcontractors and Suppliers.
   2. Include proper phasing and sequence of construction, various crafts, purchasing time, Shop Drawing approval, material delivery, equipment fabrication, start-up, demonstration, and similar time consuming factors.
      a. Application software: Microsoft Project, or equal.
   3. Show the order and interdependence of activities.
      a. The start of an activity shall be dependent on the completion of a preceding activity(ies), with Notice to Proceed being the initial activity.
      b. Divide activities if necessary, such that the maximum duration of any list activity is 20 days.

D. Evaluate schedule no less than monthly and as required elsewhere in Contract Documents:
   1. Update, correct and submit to Engineer with pay application to show rescheduling necessary to reflect true job conditions.
   2. When shortening of various time intervals is necessary to correct for behind schedule conditions, indicate actions to implement to accomplish work in shorter duration.
   3. Information shall be submitted to Engineer in writing with revised schedule.

E. If Contractor does not take necessary action to accomplish work according to schedule, Contractor may be ordered by Owner in writing to take necessary and timely action to improve work progress.
   1. Owner may require increased work forces, extra equipment, extra shifts or other action as necessary.
   2. Should Contractor refuse or neglect to take such action authorized, under provisions of this contract, Owner may take necessary actions including, but not necessarily limited to, withholding of payment and termination of Contract.

F. Provide two-week look-ahead schedules every two (2) weeks and at each construction progress meeting or pre-installation conference.

1.4 PROJECT/SITE CONDITIONS

A. The project site is adjacent to active solid waste disposal areas regulated by the State of Iowa.
   1. Contractor shall take appropriate measures and employ the use of appropriate equipment to conduct construction operations in a safe manner that takes into account the types of waste and the by-products thereof that could be present.
      a. By-products may include but are not necessarily limited to: Solid waste, landfill gases, and leachates.
   2. Remove solid waste encountered in grading and as a result of weather events and dispose of at the landfill active face, and as directed by MWA, by the end of each workday.
      a. If waste is exposed due to excavation activity or as a result of other related events, waste must be covered with at least 6 IN of soil at the end of each workday.
      b. A waterproof tarp may be substituted with MWA approval.
      c. Contractor will not be paid for removal of weather related solid waste.
   3. If existing solid waste is exposed by Contractor's construction, activity shall be covered by the end of each working day with a minimum of 6 IN of soil or in a manner acceptable to the Owner and the Iowa Department of Natural Resources.

B. Designated Soil Borrow Areas:
   1. Soil borrow areas are designated on the Drawings and include the proposed cell liner construction area and the current landfill soil borrow areas.
      a. The current landfill soil borrow areas are anticipated to be used for Owner soil requirements for landfill operations.
      b. The haul route to and from the stockpile area is incidental to this project. Route shall be limited to a southern route determined in coordination with the Owner (not through farm field).

C. Health and Safety Plan (HASP):
   1. Contractor shall employ the services of a Certified Safety Professional or Certified Industrial Hygienist to:
      a. Evaluate the potential site conditions.
      b. Develop a site specific HASP following the requirements of 29-CFR 1910.120, 29-CFR 1910.146, and the documents in Attachment A as required.
         1) Such plan shall include appropriate measures for confined space entry and fall protection as project conditions warrant.
      c. The Contractor's HASP shall be kept on file at the Contractor's field office and made available to the Owner prior to start of construction.
      d. The Contractor's HASP shall include, at a minimum, the following information:
         1) Project organization chart showing Contractor's Site Safety Officer.
         2) Summary of the health monitoring program.
         3) Summary of the respiratory protection and site monitoring program.
         4) Summary of protective clothing required.
         5) Summary of decontamination procedures.
         6) List of employees that have completed health and safety training and certificates received.
         7) Description of personnel and visitor access and egress controls.

e. The Contractor shall be solely responsible for methods and precautions taken while performing work on the project sites to ensure the health and safety of their personnel and of other persons and operations resulting from work on this project.
f. A Certified Safety Professional shall be certified by the Board of Certified Safety Professionals (BCSPs).

2. Contractor shall complete all work involving the intrusion into existing waste, any confined excavations (such as trenches), and exposure to waste byproducts in conformance with the health and safety requirements stipulated in the Contract Documents and as applicable to the specific situations.
3. Personal Protective Equipment:
   a. Determination of the appropriate level of personal protective equipment and procedures shall be made as a result of initial site survey, review of existing data, and a continued safety and health monitoring program performed by the Contractor's site Safety Representative for the project.
   b. All Owner guidelines, rules and requirements shall be followed; see Attachment A.

D. Special Considerations:
1. Smoking shall not be permitted within the limits of the Metro Park West property.
2. Possible presence of harmful or dangerous substances:
   a. Construction of this Project will require special precautions because of the conditions that exist in a landfill environment. These conditions include but are not limited to: the possible presence of potentially explosive and harmful gases resulting from decomposition of organic and other substances; the presence of leachate which is a liquid which emanates from a landfill and which contains dissolved, suspended, and or microbial contaminants from the solid waste deposits. Contact with this liquid may be harmful to human life.
   b. The Contractor is advised that landfill gases including varying concentrations of methane and hydrogen sulfide gas are known to be present within the landfill.
      1) Such gases are explosive in certain concentrations and also represent a hazard to life under certain conditions including but not limited to confined areas such as leachate lines and tanks, manholes, trenches, and buildings.
      2) Because of these gaseous conditions, the Contractor shall provide any monitoring required to determine the presence, composition, and concentration of gases.
   c. The Contractor is also advised that leachate may be present in unknown quantities within the limits of the Project.
      1) Laboratory analysis of leachate samples indicates the presence of low concentrations of volatile organic compounds including acetone, benzene, toluene, and methyl ethyl ketone. pH of the leachate generally ranges from 6 to 7 units.
      2) The Contractor shall be responsible for determining the presence of any potential hazards of any leachate encountered and shall be responsible for implementing safety measures as are appropriate.
         a) These measures may include, but shall not be limited to: protective clothing, special breathing apparatus, and explosion proofing and non-sparking equipment.

PART 2 - PRODUCTS (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

Metro Waste Authority

Contractor's Safety Rules

Metro Park East Landfill
Metro Park West Landfill
Metro Compost Center
Metro Central Transfer Station
Metro Northwest Transfer Station
Metro Hazardous Waste Drop Off
Administrative Office

Revised: March, 2020

THIS PAGE INTENTIONALLY LEFT BLANK

Metro Waste Authority Safety and Health Rules for Outside Contractors

All federal, state, and local safety and health regulations and all Metro Waste Authority safety and health rules must be observed by the employees of outside contractors. Contractor supervisors shall ensure that all of their employees are aware of and comply with the rules and regulations.

Contractors will abide by all posted speed limits, safety rules, and regulations.

VIOLATORS WILL NOT BE PERMITTED TO WORK AT METRO WASTE AUTHORITY FACILITIES.

I. SMOKING
No smoking is permitted in buildings, or on the premises of any MWA facility except in the designated smoking areas. These areas are posted on site. There is no smoking anywhere on Metro Hazardous Waste Drop Off grounds.

II. SAFETY PERMITS/CERTIFACATIONS Safety permits AND/OR program/training certifications must be obtained for the following operations BEFORE work begins:

A: Lockout/Tag-out Procedures required for work on any equipment that could cause injuries if started accidentally.

B: Confined Space Entry Permit:

If confined space entry is anticipated, submittal of the contractor's and/or subcontractors confined space entry program will be required before any work is initiated. The confined space program will detail how confined spaces are determined, tested, and entered.

C: Hot Work Permit:

Required for all open flame or spark producing activities on site.

D: General Industry Walking-Working Surfaces and Fall Protection Standards:

Submittal of the contractor's and/or subcontractor's documentation for Walking-Working Surfaces and Fall Protection program employee training will be required before any work is initiated.

E: Other Permits:

May be required for special procedures or unusual work conditions. Your MWA contact person will coordinate permit requests for the specific area where the work is being performed.

III. HOUSEKEEPING
Work areas must be cleaned and all debris disposed of at least daily. Equipment and supplies must be stored neatly. Aisles, passageways, roadways, fire and other emergency equipment access must be kept clear at all times.

IV. SAFETY SUPPLIES AND PERSONAL PROTECTIVE EQUIPMENT
Approved hard hats are required at the working face and where directed. Other PPE may be required depending on the task and activities being performed.

Class II safety vests or clothing are required to be worn when performing activities on or near the working face or when working on or near roadways in and around the site.

Contractors are required to provide their employees with high visibility items when employees are working in the areas outlined above.

Metro Waste Authority does not provide other safety supplies such as gloves, face shields, goggles, fire extinguishers, and protective clothing for outside contractors. Equipment such as ladders, welding equipment, scaffolds, machinery, tools, forklifts, vehicles, etc. are not loaned to outside contractors without prior authorization from management.

Respiratory protection may be required to be worn by employees. If required, contractors must supply their employees with adequate respiratory protection and train them in the proper use of respirators. Metro Waste Authority may request documentation of training including the names of all employees trained and the manufacturer and model of respiratory equipment for which they have been trained to use.

V. EMERGENCY CONDITIONS

In an emergency, contractor employees will follow instructions given by any managerial employee of Metro Waste Authority. In the event of an evacuation or other on site emergency, contractors are asked to meet at the meeting point designated in the ERRAP.

VI. OTHER GENERAL SAFETY RULES

A. Compressed gas cylinders must be transported, stored, and used in an upright position. All cylinders shall be secured by a chain, or equivalent, with protective caps installed during transit and storage. Cylinder valves shall be closed as soon as work is completed. Oxygen cylinders shall be stored a minimum of20 feet from fuel gas (acetylene, hydrogen, etc.) cylinders when not on the welding cart.

B. When overhead work is necessary, precautions must be taken to prevent fall of persons and materials. The area underneath the work operation shall be roped off and labeled with appropriate warning signs.

C. Flammable liquids shall be stored in and dispensed from approved containers.

D. Ladders must be in good condition and must be made secure near the top.

Scaffolding shall be of substantial construction with guardrails and toe boards installed.

E. Posted traffic control signs must be obeyed at all times and vehicles must be kept in safe operation condition

F. Posted safety signs must be obeyed and observed at all times.

G. Do not shut off or make connections to electric, gas, air, water, or process lines without the prior authorization of Metro Waste Authority managerial personnel.

H. Safety barricades must be put in place at open man holes, floor holes, catch basins, and excavations. Appropriate lights must be installed if holes are to be left open after daylight hours.

I. Firearms and weapons are not permitted on Metro Waste Authority prope1iy for any reason nor are alcoholic beverages or drugs. Violation of these rules will be grounds for immediate expulsion from the facility.

J. SDS Sheet must be provided to Metro Waste Authority personnel before any product is used at the facility.

Metro Waste Authority

Contractor Orientation

Metro Park East Landfill
Metro Park West Landfill
Metro Compost Center
Metro Central Transfer Station
Metro Northwest Transfer Station
Metro Hazardous Waste Drop Off
Administrative Office

Revised 11/01/2019

THIS PAGE INTENTIONALLY LEFT BLANK

Metro Waste Authority Contractor Orientation Written Program

Metro Waste Authority policy mandates the requirement to provide an orientation to all project contractors. OSHA's Right to Know and Lock-out/Tag-out must also be reviewed as appropriate. The following is a written program developed by Metro Waste Authority which details the provisions of the orientation requirement and clearly defines who requires what type of orientation.

This written program does not address procedural items that a Metro Waste Authority employee overseeing a project would typically review with the Contractor. All contractors will be provided an orientation session **prior to commencement of work**, and documentation will be completed to confirm that this orientation was performed (certification form attached). This orientation will be a one time event, and if necessary repeated if new information is required to be conveyed.

Additionally, be before any work is to be done, contractor will provide Metro Waste Authority with a certificate of insurance with a minimum coverage of $1 million and naming **Metro Waste Authority as additionally insured.**

The following highlights the subject matter to be covered in the **contractor orientation** session:

1. A hand-out and review of Metro Waste Authority's Contractor Safety Rules (attached), with emphasis on the following:
   - The need for adhering to all applicable safety requirements
   - The need for using personal protective equipment when necessary,
   - The need to report any accidents or injuries to Metro Waste Authority personnel
   - Emergency phone numbers
   - Requirements for obtaining permits when necessary.

2. An overview of OSHA's Right to Know program, including an explanation of the potential hazards at the site. The contractor will be informed of the location to obtain the MSDS for all on site products, and be informed of his right to access these at any time.

3. The contractor will be made aware of the facility's Emergency Response & Remedial Action Plan and the procedures to follow in the event of an emergency.

4. If applicable, OSHA's Lock-out/Tag-out, Confined Space Requirements, and Hot Work Permit procedures will be explained.

5. Spill prevention and procedures for spill clean-up, including notification of Metro Waste Authority personnel, will be reviewed for contractors who would be using any petroleum based products on MWA property.

6. A "Contractors Safety Declaration" is required and would need to be signed when any contractor is working on site.

For the purpose of this written program, a contractor is defined as any person hired to perform a particular job task at the facility. A contractor is not a delivery person, a visitor, a customer, or a truck driver delivering or picking up solid waste. The aforementioned would not be subject to the requirements of this written program. Current orientation documentation will be kept in a "Contractor's Orientation File". Retention of documentation will be for a period of three years.

Contractor Safety Orientation Review

1. Hand-Out and Review of Health and Safety Rules - emphasis on the following:

   - Proper permits need to be completed and approved, when necessary.

   - Proper housekeeping, maintaining a neat work area, and removing all materials for the site when project is completed.

- All safety equipment will be supplied by the Contractor. Metro Waste Authority will not supply anything.
- All traffic and site safety signage must be obeyed.
- No drugs, alcohol, or weapons are permitted on MWA property.

2. 911 is the emergency number for all facilities.

3. Any accident or injury must be reported to a Metro Waste Authority manager.

4. OSHA's Right to Know (Hazard Communication) - This program is an OSHA requirement that requires employers to ensure that their employees, including all contractors on site, are aware of any hazards that they may be exposed to in the workplace. The Right to Know program usually deals with potential exposures to chemicals in the workplace. Contractors will be made aware of any types of hazards that they may be working around. Contractors will be made aware of the existence of Safety Data Sheets (SDS) for all of the products used on site. The SDS will provide information on the symptoms and treatment of over exposure to the products. The contractor must be made aware of the location of how to obtain the SDS. The contractor is welcome to obtain a copy of any SDS. They need to request a copy to be made The contractor can at any time request that the SDS be reviewed by MWA should there be a concern about their potential exposure to a product. Should the contractor be directly working around a certain product, a SDS for that product must automatically be provided to him or her.

5. Emergency Response & Remedial Action Plan (ERRAP) - Contractors will be made aware of the facility's ERRAP. The ERRAP deals with major emergencies that may arise such as fire, or a major accident. Contractors need to know that should there be an emergency, they will be notified by Metro Waste Authority staff and that they should immediately report the emergency meeting area, located in the ERRAP for that facility. Once all employees and contractors are accounted for, they will be able to leave the site should the situation warrant. **All contractors must sign in and out each day at the administrative office of each specific MWA facility. Exceptions to this can be arranged with the appropriate facility's manager**

6. All spills of petroleum products or any chemical needs to be reported to a Metro Waste Authority supervisor immediately. All spills may be subject to reporting to the IDNR within 4 hours of the spill. The contractor should ensure that the spill is contained before leaving the area to report the spill. Metro Waste Authority will issue guidance on the clean-up procedures.

7. OSHA's Lock-out/Tag-out-Contractor's who may have occasion to be repairing equipment on site must follow OHSA's Lock-out/Tag-out program. If the contractor is a contracted mechanic servicing Metro Waste Authority equipment, they should be made aware that there are lock-out/tag-out procedures for each piece of equipment on site. Contracted mechanics must follow these procedures in order to be in compliance with OSHA's requirements.

Metro Waste Authority
CONTRACTOR SAFETY DECLARATION

As the duly authorized and designated representative and agent of _____, hereinafter called "Contractor", I hereby certify and agree for myself and for and on behalf of Contractor that:

* Contractor has received an orientation briefing including, but not limited to, site-specific safety rules, accident/injury reporting, emergency procedures and potential hazards in the Contractor's work area during routine site operations;

* Contractor will instruct all of its agents and employees in the topics covered at the above orientation, before they are allowed to work on-site;

* Contractor has received a written copy of the site-specific and any relevant task-specific safety rules and will ensure that its employees and agents comply with those rules, as well as any applicable federal, state, and local Safety and Health regulations;

* Contractor will provide required personal protective equipment for its employees and agents working on Metro Waste Authority property;

* Contractor employees have received training in appropriate Safety and Health topics (including, but not limited to, confined space awareness, respiratory protection, hearing conservation, hazard communication and equipment operation), in accordance with state and federal OSHA regulations; and

* Contractor performs regularly scheduled maintenance on owned or leased vehicles and equipment, as per state and federal OSHA regulations (20 CFR 1910 and 1926; Known defects will be repaired prior to operation and, as defects become apparent during equipment operations, the equipment will be taken out of service until repairs are made.

This decision is hereby incorporated into the contractual agreement with:

_____Which is dated ____/____/____

_____ ____/____/____
Contractor's Representative Date

_____ ____/____/____
MWA Employee Presenting Orientation Date

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 21 00
ALLOWANCE (LUMP SUM AND UNIT PRICE PROJECTS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provisions for handling Allowance.

1.2 ALLOWANCE

A. Allowance(s) are established to provide the Owner with a method for compensating the Contractor for specific items of Work that are not completely defined in the Contract Documents prior to the award of contract and maybe required to complete the Work.

B. Allowance(s) for minor changes are for the exclusive use of Owner as a result of changed conditions, design refinements, and unanticipated design issues.
   1. The Owner will issue a field order or directive to proceed with the work as defined in the Allowance below.
   2. The Owner can compensate the Contractor for the work as defined below without issuing a change order as long as the costs are within the Allowance amount stated in the Contract.
   3. Owner approval is required prior to the start of the work and/or authorization of progress payments for the Allowance(s).
   4. The Owner and Contractor can agree to compensate the Contractor for work covered by the Allowance(s) in one or more of the following methods;
      a. Lump sum payment agreed to prior to beginning the work,
      b. Agreed on unit prices measured against actual installed quantities, and/or
      c. Contractor's actual costs as documented on force account sheets completed daily and approved by the Owner. Overhead and Profit will be compensated through the Contractor's Fee as defined in the Contract Documents.

C. Contractor shall include in the Bid an Allowance equal to 5.0% of the proposed base bid amount.
   1. Include Allowance sum on Bid Form on the line provided.
   2. The Total Contract Price shall be the sum of the Base Bid and the Allowance.
   3. At Project closeout and prior to Final Payment, adjust the final Contract Sum accordingly by Change Order. Amount of the Change Order shall reflect difference between actual costs of all approved Allowance(s) and the Allowance Amount.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 25 13
PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. The procedure for requesting the approval of substitution of a product that is not equivalent to a product which is specified by descriptive or performance criteria or defined by reference to one or more of the following:
      a. Name of manufacturer.
      b. Name of vendor.
      c. Trade name.
      d. Catalog number.
   2. Substitutions are not "or-equals."
   3. This Specification Section does not apply to Proprietary Specifications.

B. Related Specification Sections include but are not necessarily limited to:
   1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 01 - General Requirements.

C. Request for Substitution - General:
   1. Base all bids on materials, equipment, and procedures specified.
   2. Certain types of equipment and kinds of material are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers.
      a. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are "or-equals," as determined by Engineer.
   3. Other types of equipment and kinds of material may be acceptable substitutions under the following conditions:
      a. Or-equals are unavailable due to strike, discontinued production of products meeting specified requirements, or other factors beyond control of Contractor; or,
      b. Contractor proposes a cost and/or time reduction incentive to the Owner after Award of Bid.

1.2 QUALITY ASSURANCE

A. In making request for substitution, Contractor represents:
   1. Contractor has investigated proposed product and has determined that it is adequate or superior in all respects to that specified, and that it will perform function for which it is intended.
   2. Contractor will provide same guarantee for substitute item as for product specified.
   3. Contractor will coordinate installation of accepted substitution into work, to include building or facility modifications if necessary, making such changes as may be required for work to be complete in all respects.
   4. Contractor waives all claims for additional costs related to substitution which subsequently arise.
   5. Any exceptions to the above shall be clearly stated at the time a request is submitted to consider a substitution.

1.3 DEFINITIONS

A. Product: Manufactured material or equipment.

1.4 PROCEDURE FOR REQUESTING SUBSTITUTION

A. Substitution shall be considered only:
   1. After Award of Contract.
   2. Under the conditions stated herein.

B. Written request through Contractor only.

C. Transmittal Mechanics:
   1. Follow the transmittal mechanics prescribed for Shop Drawings in Specification Section 01 33 00.
      a. Product substitution will be treated in a manner similar to "deviations," as described in Specification Section 01 25 13.
      b. List the letter describing the deviation and justifications on the transmittal form in the space provided under the column with the heading DESCRIPTION.
         1) Include in the transmittal letter, either directly or as a clearly marked attachment, the items listed in Paragraph D below.

D. Transmittal Contents:
   1. Product identification:
      a. Manufacturer's name.
      b. Telephone number and representative contact name.
      c. Specification Section or Drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.
   2. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.
   3. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:
      a. Size.
      b. Composition or materials of construction.
      c. Weight.
      d. Electrical or mechanical requirements.
   4. Product experience:
      a. Location of past projects utilizing product.
      b. Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.
      c. Available field data and reports associated with proposed product.
   5. Data relating to changes in construction schedule.
   6. Data relating to changes in cost.
   7. Samples:
      a. At request of Engineer.
      b. Full size if requested by Engineer.
      c. Held until substantial completion.
      d. Engineer not responsible for loss or damage to samples.

1.5 APPROVAL OR REJECTION

A. Written approval or rejection of substitution given by the Engineer.

B. Engineer reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.

C. In the event the substitution is approved, the resulting cost and/or time reduction will be documented by Change Order in accordance with the General Conditions.

D. Substitution will be Rejected if:
   1. Submittal is not through the Contractor with his stamp of approval.
   2. Request is not made in accordance with this Specification Section.
   3. In the Engineer's opinion, acceptance will require substantial revision of the original design.

4. In the Engineer's opinion, substitution will not perform adequately the function consistent with the design intent.

E. Contractor shall reimburse Owner for the cost of Engineer's evaluation whether or not substitution is approved.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

EXHIBIT A

Substitution Request Form
(One Item per each Form)

Project:		Date:
Substitution Requestor:		
Contractor:		
Specification Section No:	Paragraph No. (i.e. 2.1.A.1.c):	Specified Item:
Proposed Substitution:		

Provide Product Data Sheets, Manufacturer's written installation instructions, drawings, diagrams, or any other information as an attached to this Form that will demonstrate the proposed substitution is an Approved Equal.

In the lines provided state differences between proposed substitutions and specified item. Differences include but are not limited to interrelationship with other items; materials, equipment, function, utility, life cycle costs, applied finished, appearances, and quality.

_____
_____
_____

In the lines provided demonstrate how the proposed substitution is compatible with or modifies other systems, parts, equipment or components of the Project and Work under the Contract
:

_____
_____
_____

In the lines provided, describe what effect the proposed substitution has on dimensions indicated on the Drawings and previously reviewed Shop Drawings?

_____
_____
_____

In the lines provided, describe what effect the proposed substitution has on the Construction Schedule and Contract Time.

_____
_____
_____

In the lines provided, describe what effect the proposed substitution has on the Contract Price. This includes all direct, indirect, impact and delay costs.

_____
_____
_____

Manufacturer's guarantees of the proposed and specified items are:

☐ Same ☐ Different (explain on attachment)

The undersigned state that the function, utility, life cycle costs, applied finishes, appearance and quality of the proposed substitution are equal or superior to those of the specified item.

For use by Project Representative:

☐ Accepted ☐ Accepted as Noted
☐ Not Accepted ☐ Received Too Late

_____
(Date)

_____
(Telephone)

_____
(Contractor's Signature)

_____
(Contractor's Firm)

_____
(Firms Address)

_____

Comments:

_____
_____
_____

SECTION 01 29 01
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section Includes:
   1. Administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. For lump sum contracts, furnish a statement allocating portions of the Contract Sum to various portions of the Work which will be used as the basis for reviewing Applications for Payment.
   1. Submit preliminary Schedule of Values utilizing the template format and work breakdown provided as an attachment to this Section within 10 days after the effective date of the Agreement.
   2. Before submittal of first progress payment, make corrections and adjustments as necessary to obtain an acceptable Schedule of Values and resubmit to the Engineer.
      a. No progress payment requests will be processed until the Schedule of Values is accepted by the Engineer.

B. Format and Content:
   1. Use the form provided and supplement as necessary using the Project Manual table of contents as a guide to establish additional line items for the Schedule of Values. Provide at least one line item for each Specification Section.
   2. Include the following project identification on the Schedule of Values:
      a. Project name, location, and Owner contract/project number.
      b. Name of Engineer.
      c. Engineer's project number.
      d. Contractor's name and address.
      e. Date of submittal.
   3. Arrange the Schedule of Values for the lump sum Bid Item No. 1 (or, alternatively, the Bid Item No. fully executed) per Specification Section 00 80 00, with the following subdivisions, description of work and dollar values for each:
      a. Subcontractor work.
      b. Manufacturer or fabricator.
      c. Supplier.
      d. Contractor work.
   4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports.
   5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
   6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
      a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense at Contractor's option.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as recommended by the Engineer and approved by Owner.

B. The date for each progress payment is on or about the first of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 10 days before the date for each progress payment.

C. Requests for progress payments shall be submitted at least 10 days before the date established for each progress payment, but not more often than once a month. Use forms provided in Contract Documents for Applications for Payment. Sample copy of the Application for Payment and Continuation Sheet is included in Section 01 29 01A.

D. Application Preparation Procedures:
   1. When requested by the Contractor, the Engineer will determine the estimated quantities and classifications of Unit Price Work performed.
      a. Preliminary determinations will be reviewed with the Contractor before submitting Application for Payment.
      b. Contractor will complete the Application for Payment based on Engineer's decision on actual quantities and classifications.
      c. Engineer will submit copies of Application for Payment to Contractor for certification.
         1) Contractor shall submit signed Application for payment to Owner for approval within time frame agreed to at the Preconstruction Conference.
   2. For a lump sum price contract, the Contractor shall prepare a preliminary determination for payment based on the approved Schedule of Values and review with Engineer before completing Application for Payment.
      a. Payment for lump sum bid items shall be in the amount of scheduled values of each of the aggregate components comprising the lump sum items multiplied by the respective percent completion estimate.
   3. If payment is requested for materials and equipment not incorporated in the Work, then the following shall be submitted with the Application for Payment:
      a. Evidence that materials and equipment are suitably stored at the site or at another location agreed to in writing.
      b. A bill of sale, invoice, or other documentation warranting that the materials and equipment are free and clear of all liens.
      c. Evidence that the materials and equipment are covered by property insurance.
   4. Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor.

E. With each Application for Payment, submit the Following Documents:
   1. Waivers of liens from subcontractors and suppliers for the construction period covered by the previous application.
      a. Submit partial waivers on each item for amount requested before deduction for retainage on each item.
      b. When an application shows completion for an item, submit final or full waivers.
      c. Owner reserves the right to designate which entities involved in the Work shall submit waivers.
      d. Submit final Application for Payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application.
      e. Submit waivers of lien on forms executed in a manner acceptable to Owner.
   2. Project schedule updated in accordance with criteria contained in Section 01 11 20 - Job Conditions.

F. The following administrative actions and submittals shall precede or coincide with submittal of first Application for Payment:
   1. List of subcontractors.
   2. Schedule of Values.
   3. Contractor's construction schedule.
   4. Copies of applicable permits.
   5. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.

G. Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted including, but not limited, to the following:
   1. Evidence of completion of Project closeout requirements.
   2. Insurance certificates for products and completed operations where required and proof that taxes, fees and similar obligations were paid.
   3. Updated final statement, accounting for final changes to the Contract Sum.
   4. Consent of Surety to Final Payment.
   5. Final lien waivers as evidence that claims have been settled.
   6. Final liquidated damages settlement statement.
   7. Requirements listed in Section 01 77 01 - Closeout Procedures.

1.4 MEASUREMENT AND PAYMENT

A. Lump Sum Bid Items General:
   1. Measurement of lump sum bid items will be based on an estimated percent complete of the various components of the lump sum item established by the Contractor's Schedule of Values and approved by the Engineer. Contractor will make progress estimates on or about the first day of the month and submit to Engineer for review and approval.

B. Unit Price Items:
   1. Bulk Excavation to Cell D and Perimeter Road Base Grade Elevations:
      a. Measurement shall be by the cubic yard volume of soil excavated from the bulk excavation area and placed as measured by survey instrument in the cell D and road area. No additional payment shall be made for excavation made beyond the design grades.
      b. The quantity of bulk excavation shall be paid for at the Unit Price per cubic yard for the pay item "Bulk Excavation to Cell D and Perimeter Road Base Grade Elevations".
   2. Structural Fill to reach Cell D, Phase 2 Access Road, and Perimeter Road Base Grade Elevations:
      a. Measurement shall be by the cubic yard volume of soil excavated from the bulk excavation area and/or soil borrow and placed as measured by survey instrument in the cell D and road area. No additional payment shall be made for excavation made beyond the design grades.
      b. The quantity of bulk structural fill excavation shall be paid for at the Unit Price per cubic yard for the pay item "Structural Fill to reach Cell D, Phase 2 Access Road, and Perimeter Road Base Grade Elevations".
   3. Remove and Replace Unsuitable Soils Below Base Grade (Cell D Liner System):
      a. Measurement shall be by the cubic yard volume of unsuitable soil removed and replaced as measured by tape or survey instrument by the Owner's representative.
      b. The quantity of unsuitable soils removed and replaced shall be paid for at the Unit Price per cubic yard for the pay item "Remove and Replace Unsuitable Soils Below Base Grade (Cell D Liner System)".
   4. Seeding All Areas (Install Owner supplied Topsoil/Amended Topsoil (compost). Install Seed, Fertilize, and Mulch):
      a. Measurement shall be by the acreage of surveyed area. Seeded area to be determined in coordination with the Owner.
      b. The quantity of seeding shall be paid for at the Unit Price per acre for the pay item "Seeding all Areas (Install Owner supplied Topsoil. Install Seed, Fertilize, and Mulch)".
      c. Additional areas to be seeded (including all disturbed, vegetated areas resulting from Contractor's work activities) shall be included within Lump Sum pricing and included within the Contractor's submitted schedule of values.

C. Alternate Bid Items
   1. Security Fencing and Gate:
      a. Measurement shall be by the linear foot length of security fence installed at location as shown on the Drawings. Double swing gate shall be included in pricing. Litter fencing

to be removed, salvaged, and reinstalled per the Drawings shall be including in lump sum pricing for Item No. 102 – Construct Cell D Liner and Leachate Collection System.

b. The quantity of security fencing installed shall be paid for at the Unit Price per linear foot for the pay item "Security Fencing and Gate".

2. Phase 2 Access Road to Cell D Aggregate Surfacing:
   a. Measurement shall be treated as a lump sum bid item inclusive of roadway geotextile, base course aggregate, and surface course aggregate at locations as shown on the Drawings. Structural fill excavation, hauling, placement, grading, compaction, testing, and the requirements listed in the Specifications and Drawings shall be included under lump sum pricing for Item No. 106 – Structural Fill to reach Cell D, Phase 2 Access Road, and Perimeter Road Base Grade Elevations.
3. Tipping Pad Turnaround Area Aggregate Surfacing:
   a. Measurement shall be treated as a lump sum bid item inclusive of roadway geotextile, base course aggregate, and surface course aggregate at locations as shown on the Drawings. Structural fill excavation, hauling, placement, grading, compaction, testing, and the requirements listed in the Specifications and Drawings shall be included under lump sum pricing for Item No. 106 – Structural Fill to reach Cell D, Phase 2 Access Road, and Perimeter Road Base Grade Elevations.
4. MW-16 Electrical Line Abandonment:
   a. Measurement shall be treated as a lump sum bid item inclusive of the requirement of keynote E on sheet 01C101 to remove the existing electrical panel and reinstall at the location shown on the Drawings.
5. Metering Manhole and Flowmeter:
   a. Measurement shall be treated as a lump sum bid item inclusive of the requirements shown on sheet 02C101 and detail 5/02C501 to install the flowmeter manhole and flowmeter at the existing leachate conveyance piping. Associated earthwork including excavation, bedding, backfill, compaction, and grading shall be included within lump sum pricing for Item A114 – "Metering Manhole and Flowmeter".
6. Cell B Sump Solar Panel Pump Unit:
   a. Measurement shall be treated as a lump sum bid item inclusive of the requirements shown on Drawing sheet 01C102 and the requirements of Note 10.
7. Greene Co. Gas Infrastructure Improvements:
   a. Measurement shall be treated as a lump sum bid item inclusive of the requirements shown on 02C101 and 02C501. Pricing shall include the access riser as shown in detail 1/02C501.
8. Excavation of Excess Soils to Building Pad Structural Fill:
   a. Measurement shall be by the cubic yard volume of soil excavated from the soil borrow area and placed as measured by survey instrument in the placement area.
   b. The quantity of excavation and placement shall be paid for at the Unit Price per cubic yard for the pay item "Excavation of Excess Soils to Building Pad Structural Fill".

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract): MWA P-64 Cell D Liner & Greene Co. LF Improvements	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D				
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
	Project P-64 Cell D Liner & Greene Co. LF Improvements							
	101 Mobilization, demobilization, and all work not included in Bid Item Nos. 102 through 108							
	Mobilization							
	Demobilization							
	Project Management							
	Temporary Facilities							
	Bonds & Insurance							
	Record Documentation and Surveys							
	Field Engineering Layout and Control							
	Topsoil Stripping							
	Pumping							
	Erosion Control/Ditching							
	Soils Testing							
	102 Construct Cell D Liner and Leachate Collection System							
	Exterior Grading							
	Groundwater Control System							
	Recompacted Clay Liner							
	Soils Testing							
	Liner Perimeter							
	60-mil HDPE Geomembrane							
	Liner System Geotextile							
	Leachate Collection Line - PVC							
	Crushed Glass Drainage Material							
	TV Inspection of Leachate Lines							
	12-mil Geomembrane Rain Cover							
	Straw Mulch							
	103 Construct Greene Co. LF Improvements							
	Site Prep							
	Demolition							
	General Earthwork including bulk excavation and stockpiling, trenching, processing, backfilling, embankment, and compacting							
	Temporary leachate management							
	Temporary groundwater and stormwater management							
	HDPE dual-contained pipe material and installation							
	HDPE single-contained pipe material and installation							
	HDPE pipe cleanouts							
	HDPE access riser installation							
	Sump lift station, pump, and appurtenant structures							
	Electrical and Wiring Components/Install							
	Aggregate backfill							
	Gas Collection Infrastructure Components							
	107 Facility Improvements							
	Tipping Pad Turnaround							
	Fencing							
	Culverts/Ditches							
	Electrical Abandonment							

Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract): MWA P-64 Cell D Liner & Greene Co. LF Improvements	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D				
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
	104 Perimeter Access Road							
	Culverts							
	General Earthwork including placement of structural fill to reach base grades and fine grading.							
	Aggregate base course							
	Aggregate surface course							
	109 Contingency							
	Contingency							
	A111 Phase 2 Access Road to Cell D							
	Culverts							
	General Earthwork including placement of structural fill to reach base							
	Aggregate base course							
	Aggregate surface course							
	A112 Tipping Pad Turnaround Area							
	Culverts							
	General Earthwork including placement of structural fill to reach base							
	Aggregate base course							
	Aggregate surface course							
	A113 MW-16 Electrical Line Renovations							
	Removal and salvage of existing electrical panel							
	Removal and disposal of existing underground electrical							
	Modification to existing underground electrical to new panel location							
	Reinstallation of the electrical panel as shown on Drawings.							
	A114 Metering Manhole and Flowmeter							
	General earthwork for excavation, backfilling, and compacting							
	Metering manhole material and installation							
	Flowmeter installation within metering manhole							
	leachate conveyance piping modifications							
	A115 Cell B Sump Solar Panel Pump Unit							
	Removal and salvage of existing pump							
	Solar panel and controls							
	Installation and wiring of pump within the Cell B sump							
	A116 Greene Co. Gas Infrastructure Improvements							
	General earthwork including excavation, trenching, backfill, and compaction.							
	Gas collection lateral piping and terminations.							
	Totals							

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract): MWA P-64 Cell D Liner & Greene Co. LF Improvements	Application Number:
Application Period:	Application Date:

A					B	C	D	E	F		G
Item		Contract Information				Estimated Quantity Installed	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
Bid Item No.	Description	Item Quantity	Units	Unit Price	Total Value of Item ($)						
	Project P-64 Cell D Liner & Greene Co. LF Improvements										
105	Excavate, Haul, Place, and Compact Soil Outside of Cell D	2,500	CY								
106	Excavate, Haul, and Place Soil at Owner's Operation Stockpile as Daily Cover	8,500	CY								
107	Remove and Replace Unsuitable Soils Below Base Grade (Cell D Liner System)	1,000	CY								
108	Seeding All Areas (Install Owner supplied Tposil. Install Seed, Fertilize, and Mulch)	5	AC								
A110	Security Fencing and Gate	1,650	LF								
A117	Excavation of Excess Soils to Building Pad Stockpile	XX	CY		#VALUE!						#VALUE!
	Totals				**#VALUE!**						**#VALUE!**

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project meetings including, but not limited to, the following:
   1. Preconstruction conference.
   2. Progress meetings.
   3. Preinstallation conferences.

1.2 PRECONSTRUCTION CONFERENCE

A. Engineer will schedule a preconstruction conference held at the Metro Park West Landfill within 10 days after the Contract Time start and before Work at the site is started.

B. Authorized representatives of the Owner, Engineer, the Contractor and its project manager and superintendent; major subcontractors; and other concerned parties shall attend the conference.
   1. All participants at the conference shall be familiar with the Project and authorized to make binding decisions of matters relating to the Work.

C. The Engineer will record meeting notes and distribute notes to the Owner, Contractor, and other parties agreed upon by the Owner.

1.3 PROGRESS MEETINGS

A. Progress meetings at the Project site will be scheduled by the Engineer at regular intervals, currently anticipated to be biweekly.

B. In addition to representatives of the Owner, the Engineer and the Contractor, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities prior to the next progress meeting shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to make binding decisions on matters relating to the Work.

C. Proposed meeting agenda may include:
   1. Review progress since the last meeting.
   2. Review the present and future needs of each entity present, including the following:
      a. Interface requirements.
      b. Time.
      c. Sequences.
      d. Status of submittals.
      e. Deliveries.
      f. Off-site fabrication problems.
      g. Access.
      h. Site utilization.
      i. Temporary facilities and services.
      j. Hours of work.
      k. Hazards and risks.
      l. Housekeeping.
      m. Quality and work standards.
      n. Change orders.
      o. Documentation of information for payment requests.

D. Updated project schedules, submitted in accordance with Section 01 29 01 – Payment Procedures, shall be provided by the Contractor at the meeting.
   1. Reflect the current status (updated by the Contractor) as of the time of the meeting.
   2. Subsequent to the meeting the schedule shall be updated to reflect issues addressed at Project Meetings.

E. Review Status of On-Site Record Documents.

F. The Engineer will record meeting notes and distribute notes to the Owner, Contractor, and other parties agreed upon by the Owner.

1.4 PRE-INSTALLATION CONFERENCES

A. Contractor shall schedule a pre-installation conference at the Project site at least 7 days before each construction activity that requires coordination with other construction. The schedule shall be coordinated with the Engineer and Owner.

B. The installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting.
   1. Advise the Engineer of scheduled meeting dates.
   2. Engineer will record significant discussions, agreements and disagreements of each conference and the approved schedule and will distribute the record of the meeting to the Contractor, Owner and other parties agreed upon by the Owner.
   3. Do not proceed with the installation of items not successfully concluded.
   4. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

PART 2 - PRODUCTS (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

SECTION 01 33 00
SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Mechanics and administration of the submittal process for:
      a. Shop Drawings.
      b. Samples.
      c. Miscellaneous submittals.
   2. General content requirements for Shop Drawings.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 01 - General Requirements.
   3. Sections in Divisions 2 through 40, as applicable, identifying required submittals.

1.2 DEFINITIONS

A. Shop Drawings:
   1. See General Conditions.
   2. Product data and samples are Shop Drawing information.

B. Miscellaneous Submittals:
   1. Submittals other than Shop Drawings.
   2. Representative types of miscellaneous submittal items include but are not limited to:
      a. Construction schedule.
      b. Soil compaction test reports.
      c. Geosynthetic materials tests.
      d. Installed equipment and systems performance test reports.
      e. Manufacturer's installation certification letters.
      f. Warranties.
      g. Evidence of Health and Safety Plan implementation.
      h. Survey data.
      i. Cost breakdown (Schedule of Values).
   3. For-Information-Only submittals upon which the Engineer is not expected to conduct review or take responsive action may be so identified in the Contract Documents.

1.3 SUBMITTAL SCHEDULE

A. Schedule of Shop Drawings:
   1. Prepare a schedule identifying all submittals anticipated and the timeframe in which they will be submitted.
   2. Submitted and approved within 10 days of receipt of Notice to Proceed.
   3. Account for multiple transmittals under any Specification Section where partial submittals will be transmitted.

B. Shop Drawings:
   1. Submittal and approval of all Shop Drawings shall be completed within 20 days of Notice to Proceed, unless the content prevents submittal within such a timeframe.

1.4 PREPARATION OF SUBMITTALS

A. General:
   1. All submittals and all pages of all copies of a submittal shall be completely legible.
   2. Submittals which, in the Engineer's sole opinion, are illegible will be returned without review.

B. Shop Drawings:
   1. Scope of any submittal and letter of transmittal:
      a. Limited to one specification section.
      b. Do not submit under any Specification Section entitled (in part) "Basic Requirements" unless the product or material submitted is specified in a "Basic Requirements" Specification Section.
   2. Numbering letter of transmittal:
      a. Include as prefix the specification section number followed by a series number ("-xx", beginning with "01") and increasing sequentially with each additional transmittal.
      b. If more than one submittal under any specification section, assign consecutive series numbers to subsequent transmittal letters.
   3. Describing transmittal contents:
      a. Provide listing of each component or item in submittal capable of receiving an independent review action.
      b. Identify for each item:
         1) Manufacturer and Manufacturer's Drawing or data number.
         2) Contract Document tag number(s).
         3) Unique page numbers for each page of each separate item.
      c. When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.
   4. Contractor certification of review and approval:
      a. Contractor's review and approval stamp shall be applied either to the letter of transmittal or a separate sheet preceding each independent item in the submittal.
         1) Stamp may be either a wet ink stamp or electronically embedded.
         2) Clearly identify the person who reviewed the submittal and the date it was reviewed.
         3) Shop Drawing submittal stamp shall read "(Contractor's Name) has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval as stipulated in the General Conditions."
         4) Letters of transmittal may be stamped only when the scope of the submittal is one item.
      b. Submittals containing multiple independent items shall be prepared with an index sheet for each item listing the discrete page numbers for each page of that item, which shall be stamped with the Contractor's review and approval stamp.
         1) Individual pages or sheets of independent items shall be numbered in a manner that permits Contractor's review and approval stamp to be associated with the entire contents of a particular item.
   5. Resubmittals:
      a. Number with original root number and a suffix letter starting with "A" on a (new) duplicate transmittal form.
      b. Do not increase the scope of any prior transmittal.
      c. Provide cover letter indicating how each "B", "C", or "D" Action from previous submittal was addressed and where the correction is found in the resubmittal.
      d. Account for all components of prior transmittal.
         1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate.
            a) Do not include submittal information for items listed with prior "A" or "B" Action in resubmittal.

2) Indicate "Outstanding-To Be Resubmitted at a Later Date" for any prior "C" or "D" Action item not included in resubmittal.
a) Obtain Engineer's approval to exclude items.

6. For 8-1/2 x 11 IN, 8-1/2 x 14 IN, and 11 x 17 IN size sheets, provide three (3) copies of each page for Engineer plus the number required by the Contractor.
   a. The number of copies required by the Contractor will be defined at the Preconstruction Conference but shall not exceed 3.
   b. All other size sheets:
      1) Submit one (1) reproducible transparency or high resolution print and one (1) additional print of each drawing until approval is obtained.
      2) Utilize mailing tube; do not fold.
      3) The Engineer will mark and return the reproducible to the Contractor for his reproduction and distribution.
7. Provide clear space (3 IN SQ) for Engineer stamping of each component defined in PREPARATION OF SUBMITTALS – Contractor Stamping.
8. Contractor shall not use red color for marks on transmittals.
   a. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible.
   b. Engineer will use red marks or enclose Engineer's marks in a cloud.
9. Transmittal contents:
   a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the Engineer.
   b. Provide submittal information or marks defining specific equipment or materials utilized on the Project.
      1) Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.
   c. Identify equipment or material use, tag number, Drawing detail reference, weight, and other project specific information.
   d. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.
   e. Do not modify the manufacturer's documentation or data except as specified herein.
   f. Submit items such as equipment brochures, cuts of fixtures, product data sheets or catalog sheets on 8-1/2 x 11 IN pages.
      1) Indicate exact item or model and all options proposed.
   g. When a Shop Drawing submittal is called for in any specification section, include as appropriate, scaled details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout drawings, rough-in diagrams, wiring diagrams, controls, weights and other pertinent data in addition to information specifically stipulated in the specification section.
      1) Arrange data and performance information in format similar to that provided in Contract Documents.
      2) Provide, at minimum, the detail specified in the Contract Documents.
   h. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet. Any deviation from Plans or Specifications not depicted in the submittal or included but not clearly noted by the Contractor may not have been reviewed. Review by the Engineer shall not serve to relieve the Contractor of the contractual responsibility for any error or deviation from contract requirements.

10. Samples:
    a. Identification:
        1) Identify sample as to transmittal number, manufacturer, item, use, type, project designation, tag number, standard specification section or drawing detail reference, color, range, texture, finish and other pertinent data.
        2) If identifying information cannot be marked directly on sample without defacing or adversely altering samples, provide a durable tag with identifying information securely attached to the sample.
    b. Include application specific brochures, and installation instructions.
    c. Provide Contractor's review and approval certification stamp or Contractor's Submittal Certification form as indication of Contractor's checking and verification of dimensions and coordination with interrelated work.
    d. Resubmit samples of rejected items.

C. Miscellaneous Submittals:
    1. Prepare in the format and detail specified in specification requiring the miscellaneous submittal.

1.5 TRANSMITTAL OF SUBMITTALS

A. Shop Drawings, Samples:
    1. Transmit all submittals to:
        a. As Designated at Pre-Construction Conference.
    2. Utilize two (2) copies of attached Exhibit "A" to transmit all Shop Drawings and samples.
    3. All submittals must be from Contractor.
        a. Submittals will not be received from or returned to subcontractors.

B. Miscellaneous Submittals:
    1. Transmit under Contractor's standard letter of transmittal or letterhead.
    2. Submit in triplicate or as specified in individual specification section.
    3. Transmit to:
        a. As Designated at Pre-Construction Conference.
    4. Provide copy of letter of transmittal to Owner's and Engineer's Representative.
        a. Exception for concrete, soils compaction and pressure test reports.
            1) Transmit one copy to Owner and Engineer’s Representative.
            2) Transmit one copy to location and individual indicated above for other miscellaneous submittals.

C. Electronic Transmission of Submittals:
    1. Transmittals may be made electronically.
        a. Use Owner’s project-specific cloud-based server system (i.e., Dropbox or similar) and an email to the Engineer containing links to each unique submittal to formally time and date stamp each submittal.
        b. Protocols and processes will be determined at the Pre-Construction Conference.
    2. Scan all transmittals into Adobe Acrobat Portable Document Format (PDF), latest version, with printing enabled.
        a. Do not password protect or lock the PDF document.
        b. Rotate sheets that are normally viewed in landscape mode so that when the PDF file is opened the sheet is in the appropriate position for viewing.
    3. Required signatures may be applied prior to scanning for transmittal.

1.6 ENGINEER'S REVIEW ACTION

A. Shop Drawings and Samples:
    1. Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:
        a. A - FURNISH AS SUBMITTED.
        b. B - FURNISH AS NOTED (BY ENGINEER).

c. C - REVISE AND RESUBMIT.
d. D - REJECTED.
e. E - ENGINEER'S REVIEW NOT REQUIRED.

2. Submittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp.
   a. Submittals not stamped by the Contractor or stamped with a stamp containing language other than that specified herein will not be reviewed for technical content and will be returned rejected.
3. In relying on the representation on the Contractor's review and approval stamp, Owner and Engineer reserve the right to review and process poorly organized and poorly described submittals as follows:
   a. Submittals transmitted with a description identifying a single item and found to contain multiple independent items:
      1) Review and approval will be limited to the single item described on the transmittal letter.
      2) Other items identified in the submittal will:
         a) Not be logged as received by the Engineer.
         b) Be removed from the submittal package and returned without review and comment to the Contractor for coordination, description and stamping.
         c) Be submitted by the Contractor as a new series number, not as a re-submittal number.
   b. Engineer, at Engineer's discretion, may revise the transmittal letter item list and descriptions, and conduct review.
      1) Unless Contractor notifies Engineer in writing that the Engineer's revision of the transmittal letter item list and descriptions was in error, Contractor's review and approval stamp will be deemed to have applied to the entire contents of the submittal package.
4. Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.
   a. If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.
   b. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
5. Submittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
   a. The portion of the submittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference).
      1) One copy or the one transparency of the "C" or "D" Drawings will be marked up and returned to the Contractor.
         a) Correct and resubmit items so marked.
   b. Items marked "A" or "B" will be fully distributed.
   c. If a portion of the items or system proposed are acceptable, however, the major part of the individual drawings or documents are incomplete or require revision, the entire submittal may be given "C" or "D" Action.
      1) This is at the sole discretion of the Engineer.
      2) In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package."
      3) Distribution to the Owner and field will not be made (unless previously agreed to otherwise).
6. Failure to include any specific information specified under the submittal paragraphs of the Specifications will result in the submittal being returned to the Contractor with "C" or "D" Action.

7. Calculations required in individual Specification Sections will be received for information purposes only, as evidence calculations have been stamped by the professional as defined in the specifications and for limited purpose of checking conformance with given performance and design criteria.
    a. The Engineer is not responsible for checking the accuracy of the calculations and the calculations will be returned stamped "E. Engineer's Review Not Required" to acknowledge receipt.
8. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than two submittals.
    a. Engineer will record Engineer's time for reviewing a third or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time, with said costs being deducted from the lump sum amount shown in the Contractor's Bid.
9. Transmittals of submittals which the Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a prior submittal, will be returned with Action "E. Engineer's Review Not Required."
10. Samples may be retained for comparison purposes.
    a. Remove samples when directed. Include in bid all costs of furnishing and removing samples.
11. Approved samples submitted or constructed, constitute criteria for judging completed work.
    a. Finished work or items not equal to samples will be rejected.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

1

EXHIBIT A

Shop Drawing Transmittal No. _____-_____

(Spec Section) (Series)

Project Name:		Date Received:	
Project Owner:		Checked By:	
Contractor:	HDR Engineering, Inc.	Log Page:	
Address:	Address: 300 East Locust, Suite 210 Des Moines, IA 50309	HDR No.: Spec Section: Drawing/Detail No.:	
Attn:	Attn:	1st. Sub	ReSub.
Date Transmitted:	Previous Transmittal Date:		

Item No.	No. Copies	Description	Manufacturer	Mfr/Vendor Dwg or Data No.	Action Taken*

Remarks:

* The Action designated above is in accordance with the following legend:

A - Furnish as Submitted

B - Furnish as Noted

C - Revise and Submit
1. Not enough information for review.
2. No reproducibles submitted.
3. Copies illegible.
4. Not enough copies submitted.
5. Wrong sequence number.
6. Wrong resubmittal number.
7. Wrong spec. section.
8. Wrong form used.
9. See comments.

D - Rejected

E - Engineer's review not required
1. Submittal not required.
2. Supplemental Information. Submittal retained for informational purposes only.
3. Information reviewed and approved on prior submittal.
4. See comments.
5. Delegated Design - Submittal received as requested by the Contract Documents. The Engineer did not review the engineering or technical content of the submittal.

Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Any deviation from plans or specifications not depicted in the submittal or included but not clearly noted by the Contractor may not have been reviewed. Review by the Engineer shall not serve to relieve the Contractor of the contractual responsibility for any error or deviation from contract requirements.

Comments:

By Date

Distribution: Contractor | File | Field | Owner | Other

1

EXHIBIT AA

Contractor's Submittal Certification

Shop Drawing Transmittal No.: _____

Contract/Project Name: _____

_____

Company Name: _____

has

1. reviewed and coordinated this Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

2. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

3. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

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

☐ This Submittal **does not** contain any variations from the requirements of the Contract Documents.

☐ This Submittal **does** contain variations from the requirements of the Contract Documents. A separate description of said variations and a justification for them is provided in an attachment hereto identified as:

"Shop Drawing Transmittal No. _____Variation and Justification Documentation"

Insert picture file or electronic signature of Authorized Representative

_____ _____

Authorized Representative Date

SECTION 01 35 05
ENVIRONMENTAL PROTECTION AND SPECIAL CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Minimizing the pollution of air, water, or land; control of noise, the disposal of solid waste materials, and protection of deposits of historical or archeological interest.
   2. Sequencing site controls using a work schedule that balances the timing of land disturbance activities and the installation of measures to control erosion and sedimentation in order to reduce on-site erosion, off-site sedimentation and maintain water quality in a receiving stream.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. SUDAS Division 1.

1.2 SUBMITTALS

A. Contractor shall prepare all required compliance plans necessary for alternate management strategies. Such plans include those listed as Shop Drawings below.

B. Shop Drawings:
   1. See Section 01 33 00.
   2. Prior to the start of any construction activities submit:
      a. A detailed plan of all methods of control and preventive measures to be utilized for environmental protection.
      b. A drawing of the work area showing haul routes, storage areas, access routes and current land conditions including trees and vegetation stockpile areas, areas of planned disturbance beyond those designated, and any soil erosion and sediment control features (silt fence, or other best management practices) that will be disturbed and/or relocated.
      c. Modifications required by the construction activities to the Owner's approved storm water pollution prevention plan including the following provisions, if required.
   3. Contractor is required to develop a project specific plan identifying spill prevention, containment and countermeasures addressing fuel storage and re-fueling operations and other chemical handling activities, if any.
      a. If the Contractor does not comply with the Owner's Stormwater Pollution Prevention Plan (SWPPP), the Contractor shall prepare and submit for Owner's approval a Project-specific SWPPP. Such a Project-specific SWPPP shall include the following:
         1) Erosion Protection:
            a) Code of Federal Regulations, 40 CFR 122.26, and the Iowa Administrative Code, 567-60: The Contractor shall comply with soil erosion control requirements of the Iowa Code, the Iowa Department of Natural Resources (IDNR) NPDES Permit and local ordinances. The Contractor shall take all necessary measurements to protect against erosion and dust pollution on this site.
            b) Damage Claims: The Contractor will hold the Owner harmless from any and all claims of any type whatsoever resulting from damages to adjoining public or private property, including reasonable attorney's fees incurred to Owner. Further, if the Contractor fails to take necessary steps to promptly remove earth sedimentation or debris which comes onto adjoining public or private property, the Owner may, but need not, remove such items and deduct the cost thereof from amounts due the Contractor.

2) Stormwater Discharge Permit:
   a) The Owner has obtained a NPDES General Permit No. 1 for stormwater discharge associated with industrial activity from the IDNR. The Contractor and all subcontractors shall be responsible for compliance and fulfilling all requirements of the NPDES General Permit No. 1, including the Stormwater Pollution Prevention Plan/Erosion Control Plan.
   b) All documents related to the stormwater discharge permit shall be kept on site at all times and must be presented to the IDNR upon request. The on-site documents will include the Notice of Intent, Proof of Publication, Pollution Prevention Plan, Project Inspection Records and other items.
3) Pollution Prevention Plan:
   a) Site Description: Excavation and filling, trenching, grading, and drainage activities in this project will be required to drain to the existing sediment ponds.
   b) Potential sources of pollution as a result of this project relate to silts, clays, and sediment and other materials which may be transported as a result of a storm event from the construction site.
   c) Responsibility: The Pollution Prevention Plan illustrates general measures to be taken for compliance with the permit. All mitigation measures required as a result of activities are the responsibility of the Contractor. The Contractor shall take all actions necessary for installation of control measures for compliance with permit and SWPPP requirements.
   d) Controls: The Contractor shall be responsible for compliance and fulfilling all the requirements of the general permit, including, but not limited to, the following:
      (1) The Contractor shall protect adjoining property, including public utilities, sanitary and storm drainage systems and streets from any damage resulting from movement of earth or other debris from project site. Repair any damage immediately at no additional cost.
      (2) The Contractor shall prevent accumulation of earth, siltation or debris on adjoining public or private property from project site. Remove any accumulation of earth or debris immediately and take remedial actions for prevention.
      (3) Prior to site clearing and grading operations, Contractor shall install silt fence and sediment controls downstream of disturbing activities as required and as shown on the Drawings. Contractor will then proceed with project.
      (4) The Contractor shall route existing storm water flows away from construction area without disruption of existing flow paths in areas surrounding the Limits of Construction.
      (5) The Contractor shall preserve existing vegetation in areas not needed for construction.
      (6) Erosion control methods to be used on this project are shown on the Erosion Control Plan.
      (7) As areas reach their final grade and upon the completion of the storm drainage system, provide additional siltation fence, temporary silt basins and earth dikes, silt fence ditch checks and silt fence enclosures around all storm inlets. The Contractor shall provide additional siltation fence and earth dikes as may be required on all embankments, earth stockpiles and other areas to provide control.
      (8) The Contractor shall provide temporary and/or permanent seeding of areas as soon as practical upon completion of grading.
      (9) If construction activity is not planned to occur in a disturbed area for at least twenty-one days, the area shall be stabilized by temporary erosion controls within fourteen days of ceasing construction activities. The

Contractor is required to maintain all temporary and permanent erosion control measures in working order, including cleaning, repairing, replacement and sediment removal throughout the permit period. Cleaning of sediment control devices shall begin before the features have lost 50% of their capacity.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 INSTALLATION

A. The project area and control devices will be inspected by the Owner. The findings and actions taken of this inspection will be provided to the Contractor during the project. This plan may be revised based upon findings of the inspection. The Contractor shall implement all revisions.

B. Direct all storm water to the existing storm water sedimentation basins where possible.

C. Contractor shall develop localized storm water controls to comply with requirements of approved SWPPP.

D. Employ and utilize environmental protection methods, obtain all necessary permits, and fully observe all local, state, and federal regulations.

E. Land Protection:
   1. Except for any work or storage area and access routes specifically assigned for the use of the Contractor, the land areas outside the limits of construction shall be preserved in their present condition. Contractor shall confine construction activities to areas defined for work within the Contract Documents. Alternate access routes which will result in land disturbance shall be submitted for approval as part of the work plan.
   2. Manage and control all borrow areas, work or storage areas, access routes and embankments to prevent sediment from entering nearby water or land adjacent to the work site.
   3. Unless earthwork is immediately covered, protect all side slopes and backslopes immediately upon completion of final grading.
   4. Plan and execute earthwork in a manner to minimize duration of exposure of unprotected soils.
   5. Except for areas designated by the Contract Documents to be cleared and grubbed, the Contractor shall not deface, injure or destroy trees and vegetation, nor remove, cut or disturb them without approval of the Engineer. Any damage caused by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense.
   6. Grade all borrow areas to drain and prevent on-site ponding of water.

F. Solid Waste Disposal:
   1. Contractor shall maintain the working area in a reasonably clear and orderly condition and collect solid waste on a daily basis or as directed by Engineer. Contractor is responsible for maintaining a refuse bin and/or receptacle at field office.
   2. Contractor is responsible for proper disposal of all solid waste generated.
   3. Degradable, non-hazardous solid waste generated on-site is approved for disposal at the active face of the landfill on site, at no cost to Contractor.
   4. Solid waste generated off-site will not be brought onto or accepted at the site without payment of appropriate fees.
   5. Provide disposal of nondegradable solid waste to an approved solid waste disposal site or in an alternate manner approved by Engineer and regulatory agencies.
   6. Geosynthetic and pipe scraps may be disposed of at the landfill at no cost to the Contractor if delivered directly to the active face of the landfill daily by the Contractor.

G. Control of Concrete Waste:
   1. Concrete slurry waste shall not be allowed to enter storm drains or watercourses and shall be collected and disposed of or placed in a temporary concrete washout facility.
   2. A sign shall be installed adjacent to each temporary concrete washout facility to inform concrete equipment operators to utilize the proper facilities.
   3. Temporary concrete washout facilities shall be located a minimum of 50 FT from storm drain inlets, open drainage facilities, protected vegetation, and water courses. Each facility shall be located away from construction traffic or access areas to prevent disturbance or tracking.
   4. Temporary concrete washout facilities shall be constructed above grade or below grade at the option of the Contractor. Temporary concrete washout facilities shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.
      a. Above grade temporary concrete washout facility: Straw bales or sandbags secured with wood or steel stakes shall form the washout area barrier with a lining comprised of a minimum of 10 MIL polyethylene sheeting free of holes, tears, or other defects that compromise the impermeability of the material.
      b. Below grade temporary concrete washout facility: Lath and flagging at the perimeter of the lined area shall be commercial type anchoring and marking three sides of the basin comprised of a minimum of 10 MIL polyethylene sheeting free of holes, tears, or other defects that compromise the impermeability of the material. Sandbags shall be spaced around the perimeter of the lined area to hold the lining in place.
   5. Washout of concrete trucks shall be performed in designated areas only. Only concrete from mixer chutes shall be washed into concrete wash out.
   6. Once concrete wastes are washed into the designated area and allowed to harden, the concrete shall be broken up, removed, and disposed of on a regular basis.
   7. When temporary concrete washout facilities are no longer required for the work, the hardened concrete shall be removed and disposed of. Materials used to construct temporary concrete washout facilities shall be removed from the site of the work and disposed of. Holes, depressions, or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled and repaired.

H. Fuel and Chemical Handling:
   1. Store and dispose of chemical wastes in a manner approved by regulatory agencies.
   2. Take special measures to prevent chemicals, fuels, oils, oil filters, greases, herbicides, and insecticides from being disposed of, spilled, or entering drainage ways.
   3. Do not allow water used in onsite material processing, concrete curing, and other waste waters to enter a drainage way(s) or stream.
   4. Spilled material and resulting contaminated soils shall be removed and disposed of in accordance with applicable regulations.
   5. Contractor to pay all regulatory and Owner incurred costs resulting from improper discharges and corrective actions.

I. Control of Dust:
   1. The control of dust shall mean that no construction activity shall take place without applying all such reasonable measures as may be required to prevent particulate matter from becoming airborne so that it remains visible beyond the limits of construction.
      a. Reasonable measures may include paving, frequent road cleaning, planting vegetative groundcover, application of water or application of chemical dust suppressants.
      b. The use of chemical agents such as calcium chloride must be approved by the State of Iowa DOT and Owner.
   2. The Engineer will determine the effectiveness of the dust control program and may request the Contractor to provide additional measures, at no additional cost to Owner.

3. Water shall be applied by means of pressurized water truck or similar equipment, equipped with a spray system or hoses with nozzles that will ensure a uniform application of water.
    a. A daily log shall be maintained and provided to MWA each month. The log shall identify the amount of water applied, which roads applied to, and dust additive included.

J. Burning: Do not burn material on the site.

K. Control of Noise:
1. Control noise by fitting equipment with appropriate and properly functioning mufflers.

L. Equipment Maintenance and Decontamination:
1. Waste oils, fuels, lubricants and filters shall be contained and removed from site. Disposal at the landfill is not allowed.
2. Open oil containers exposed to rain shall not be permitted and all spills shall be reported to the Owner immediately.
3. All vehicles and equipment entering the limits of construction and contacting potentially hazardous materials shall be cleaned and/or decontaminated prior to leaving the site. The Contractor shall be responsible for monitoring all vehicle equipment decontamination activity.
4. Decontamination area and fluid management shall be identified in the Contractor's health and safety plan.

M. Traffic Controls:
1. Provide all necessary controls, flagmen, signage and warning necessary to prevent impacts to landfill site users and off-site roadways, if utilized.
2. Traffic control plan is subject to Owner's approval.
3. Implement all necessary control measures.
4. Minimize number and frequency of crossing of access road to landfill.
5. Repair all damage as a result of traffic crossing.
6. Maintain conditions of existing access and haul roads on the site and adjacent facilities such that access is not hindered as the result of construction related activities or deterioration.
    a. Submit traffic control plan where crossing or excavation of existing roads is anticipated and include services of flagmen as required to coordinate crossings.

N. Leachate Management:
1. When the work involves or disturbs areas containing leachate or pipelines for the conveyance of leachate, the Contractor shall be required to manage leachate generated from the site and the site leachate conveyance system until the leachate conveyance system is complete and accepted by the Owner.
2. Proper management is considered an important aspect of Project and Contractor's responsibility.
    a. Management shall include collection, pumping, handling and transfer to the on-site leachate treatment facility.
        1) Contractor shall identify construction operations that may encounter leachate and employ adequate means ahead of time to control and collect the flow of leachate such as plastic lined sumps and berms, pipe plugs, and absorbent booms.
        2) Contractor shall provide and maintain throughout construction adequate portable pumps and temporary leachate storage containers to be on standby at each construction operation that may encounter leachate such as liner tie-ins and waste excavation activities.
        3) Coordinate transfer with the Owner.
        4) Management may also include temporary on-site storage in an environmentally acceptable manner (e.g., tank(s)) prior to transfer to the on-site leachate treatment facility.
3. Provide control measures to ensure that leachate is not discharged to any surface waters.
4. Leachate generation can be highly variable.
    a. Contractor should anticipate and plan for peaks in generation.

b. Management activities are a seven (7) day per week, 24 HR per day requirement.
c. Contractor shall grade and maintain access to leachate collection points to allow for access at all times.
d. Periods of high precipitation and snow melt also tend to be periods of high leachate generation.

5. Any leachate spillage resulting from Contractor management activities shall be cleaned up immediately. Clean-up may include soil excavation and ground restoration. All costs of clean-up shall be at Contractor's expense without additional compensation.
6. Non-compliance with these requirements will result in Owner hiring a third-party to complete leachate management during construction at Contractor's sole cost.

O. Completion of Work:
1. Upon completion of work, leave area in a clean, natural looking condition.
2. Ensure all signs of temporary construction and activities incidental to construction of required permanent work are removed.

P. Historical Protection: If during the course of construction, evidence of deposits of historical or archeological interest is found, the Contractor shall cease operations affecting the find and shall notify the Owner.
1. No further disturbance of the deposits shall ensue until the Contractor has been notified by the Owner that Contractor may proceed.
2. The Owner will issue a notice to proceed after appropriate authorities have surveyed the find and made a determination to the Owner.
3. Compensation to the Contractor, if any, for lost time or changes in construction resulting from the find, shall be determined in accordance with changed or extra work provisions of the Contract Documents.
4. The site has been previously investigated and no known history of historical or archeological finds present in the Work areas.

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Temporary utilities including:
      a. Temporary sanitary facilities, including drinking water.
   2. Support facilities including:
      a. Project identification and other temporary signs.
      b. Waste disposal services.
      c. Owner/Engineer's Field Office.
      d. Other construction aids and miscellaneous services and facilities.
   3. Protection including:
      a. Barricades, warning signs, and lights.
      b. Environmental protection.

B. Provide temporary facilities and controls required for construction activities except, if any, for facilities and controls indicated as provided by the Owner.

1.2 UTILITY USE CHARGES

A. Include cost or use charges for temporary facilities in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
   1. Owner's construction forces.
   2. Occupants of Project.
   3. Engineer.
   4. Testing agencies.

B. Pay sewer service use charges for sewer usage (portable toilet), by all parties engaged in construction, at Project site.

1.3 QUALITY ASSURANCE

A. Comply with industry standards and with applicable laws and regulations of authorities having jurisdiction, including but not limited to the following:
   1. Health and safety regulations.
   2. Utility company regulations.
   3. Police, fire department and rescue squad rules.
   4. Environmental protection regulations.
   5. NFPA 241 "Standards for Safeguarding Construction, Alterations and Demolition Operations".
   6. ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition".
   7. NECA Electrical Design Library "Temporary Electrical Facilities", NFPA 70, and NEMA, NECA and UL standards and regulations for temporary electric service.

B. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

A. At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.

B. The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
   1. Keep temporary services and facilities clean and neat.

2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide undamaged materials in serviceable conditions and suitable for use intended.

2.2 EQUIPMENT

A. Provide undamaged equipment in serviceable conditions and suitable for use intended.

B. Provide temporary self-contained toilet units of temporary single-occupant toilet units of the chemical, aerated recirculation, or combustion type for use by all construction personnel.
   1. Units shall be supplied at both the Owner/Engineer office trailer location and the Contractor office trailer or staging and laydown area.
   2. Units shall be properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
   3. Units shall be fully secured to avoid tipping or otherwise causing release to the environment.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work.
   1. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay.
   1. Maintain and modify as required.
   2. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

C. Temporary Sanitary Facilities:
   1. Provide for toilets, wash facilities and drinking water fixtures in compliance with regulations and health codes for type, number, location, operation and maintenance of fixtures and facilities.
   2. Provide toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility and provide covered waste containers for used materials.
   3. Install separate self-contained toilet units for male and female personnel shielded to ensure privacy.
   4. Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition.
      a. Dispose of drainage properly.
      b. Supply cleaning compounds appropriate for each condition.
   5. Provide drinking water fountains or containerized tap-dispenser bottled-drinking water units, complete with paper cup supplies.

D. Storm Water Controls:
   1. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.
   2. Provide erosion control facilities required to prevent eroded soil from leaving the Site.
      a. See Drawings for erosion control features provided by Contractor and existing features provided by Owner.

3. Prevent storm water runoff from construction areas and other designated areas from entering the leachate collection systems of the existing landfill cells and becoming leachate until Final Completion is achieved.
    a. Protect exposed edge of existing cell liners to prevent storm water infiltration and run-on. Protection shall be as described, but not limited to, those measures identified in Drawings.
    b. Provide and maintain full time stand-by pumping equipment to remove storm water accumulation at the temporary excavations, riser pipes, trenches or other approved systems.
    c. Provide and maintain throughout construction one (1) diesel powered pump, capable of pumping 1,200 GPM at 30 FT TDH, to remove all accumulated storm water from within Cell D coordinate boundary including at all times outside of normal work hours. Standing water within the Cell D liner area is not permitted. Non-compliance with this requirement will result in Owner hiring a third-party to complete construction dewatering at contractor's sole cost. Storm water shall be discharged to 12" diameter corrugated plastic pipe to be constructed on the storm water diversion berm on the west side of Cell D. See Drawings.
    d. Reimburse the Owner for leachate handling and treatment costs incurred as a result of storm water run-on entering existing landfill cells via areas where existing liner and leachate collection systems are exposed by the Contractor.

3.2 TEMPORARY SUPPORT FACILITIES

A. Locate field offices, sanitary facilities and other temporary construction and support facilities for easy access.

B. Dewatering Facilities and Drains:
    1. Comply with dewatering requirements of applicable Specification Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities.
    2. Where feasible, use same facilities provided for the construction activities.
    3. Maintain site, excavation and construction free of standing water.

C. Temporary Enclosures:
    1. Provide temporary enclosures when appropriate for protection of construction, in progress or completed, from exposure, inclement weather, other construction operations and similar conditions.

D. Project Identification and Other Temporary Signs:
    1. Locate signs where best to inform public and instruct persons seeking entrance to the project.
    2. Support signs on posts or framing of steel or preservative-treated wood.
    3. Engage an experienced sign painter to apply graphics.
    4. Prepare and install signs to provide directional information to construction personnel, deliveries, and visitors.
    5. Do not permit installation of unauthorized signs.
    6. Fabricate and erect within 10 days following the Notice to Proceed.
    7. Maintained in clean and neat condition throughout construction.
    8. Remove and appropriately disposed of the sign when directed by Owner.

E. Contractor's Superintendent's Field Office:
    1. Establish at site of Project.
        a. Location subject to Owner's approval.
    2. Assure attendance at this office during the working times.
    3. At this office, maintain complete field file of Shop Drawings, posted Contract Drawings and Specifications, and other files of field operations including provisions for maintaining "As Recorded Drawings."
    4. Remove field office from site upon acceptance of the entire work by the Owner.

3.3 TEMPORARY PROTECTION FACILITIES

A. Temporary Fire Protection:
   1. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations".
   2. Store combustible materials in containers in fire-safe locations.
   3. Provide supervision of welding operations, combustion-type temporary heating units and other sources of fire ignition.

B. Barricades, Warning Signs, and Lights:
   1. Comply with standards and code requirements for erecting structurally adequate barricades.
   2. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard involved.
   3. Where appropriate and needed, provide lighting, including flashing red or amber lights.

C. Security Enclosure and Lockup:
   1. Install substantial temporary enclosure of partially completed areas of construction.
   2. Create and install all enclosures, barricades and structures necessary to prevent access to trenches, fall hazards, excavations, pooled water or similar areas.
   3. Provide a secure lockup for valuable stored materials and equipment.
   4. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

D. Owner/Engineer's Field Office:
   1. Establish at Metro Park West Landfill at location indicated on Drawings.
   2. Separate from Contractor's field office.
   3. General construction:
      a. Mobile office trailer as manufactured by Satellite Co., Acton, or approved equal.
      b. Interior paneling.
      c. Vinyl tile floor covering in office area.
      d. Aluminum exterior.
      e. One (1) private office area and one (1) lockable storage area accessible from exterior and interior of unit.
      f. Windows:
         1) Minimum two (2) per room, with one (1) each on opposing walls.
         2) Combination screen-storm windows.
         3) Provide horizontal louver blinds on each window.
      g. Nominal 26 FT long and 8 FT wide (minimum, equivalent to Satellite Model 830MO or similar).
      h. Minimum two (2) exterior doors for office.
         1) All exterior doors to have cylinder deadbolt locks.
         2) All exterior doors to have exterior stairs and railings.
   4. Electrical System:
      a. All fixtures, outlets, and wiring of Underwriters Laboratories, Inc. (UL) approved devices.
      b. All circuits protected by circuit breakers; fuses are not acceptable.
      c. Electrical system shall meet requirements of the latest National Electric Code (NEC).
      d. Any transformers or other devices required shall be provided and connected.
      e. Provide a circuit breaker for the incoming service.
      f. Each interior room shall have at least two (2) 110V duplex electrical convenience outlets.
   5. Electric Heating and Air-Conditioning System suitable for local climate and four seasons.
      a. System to be capable of maintaining 75 DEGF constant temperature in office room.
   6. Lighting System:
      a. Fluorescent type ceiling light fixtures of ample quantity and quality to ensure adequate lighting throughout office and storage area.

7. Furnishings:
    a. One (1) built-in desk with pencil drawer.
    b. One (1) plan table 36 IN x 72 IN.
    c. One (1) 36 IN x 72 IN cork bulletin board. One (1) 48 x 60 IN liquid marking board with minimum four-color set of compatible markers.
    d. One (1) two-drawer legal size filing cabinet.
    e. One (1) nominal 3 FT plan racks that hold a 30 IN minimum of six (6), 100 sheet sets of 30 x 42 IN Drawings.
    f. Two (2) cushioned swivel arm chairs.
    g. Two (2) folding metal chairs.
    h. Two (2) standard size waste paper baskets.
    i. One (1) standard size recycling basket.

1. Field Office Equipment:
    a. One (1) combination printer/scanner/copier: HP OfficeJet Pro7740.
        1) All units to be new and compatible with other communications systems.
        2) Printer/Scanner/Copier unit shall remain property of the Owner beyond completion of the project.
2. Internet Connection: Provide mobile hotspot high speed internet connection.
3. Maintenance:
    a. Contractor shall provide all maintenance and upkeep of trailer and equipment.
        1) Equipment breakdowns shall be repaired promptly.
    b. Janitorial service.
        1) Biweekly:
            a) Floor sweeping using dust suppressing compound.
            b) Wet mopping with floor detergent.
            c) Empty waste paper and recycling baskets.
        2) Inclement weather: Conduct weekly requirements on daily basis.
    c. Pay all utilities and communications costs.
    d. Maintain at least until Substantial Completion or until otherwise suspended by the Engineer. Remove field office from site upon acceptance of the entire work by the Owner.

3.4 OPERATION, TERMINATION, AND REMOVAL

A. Supervision:
1. Enforce strict discipline in use of temporary facilities.
2. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance:
1. Maintain facilities in good operating condition until removal.
2. Protect from damage by freezing temperatures and other elements.
3. Maintain operation of temporary enclosures, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage or accidents.
4. Prevent water-filled piping from freezing.
5. Maintain markers for underground lines.
6. Protect underground lines from damage during excavation operations.

C. Termination and Removal:
1. Unless the Owner requests that a temporary facility be maintained longer, each temporary facility shall be removed when the need for its service has ended.
2. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility.
3. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
4. Materials and facilities that constitute temporary facilities are the property of the Contractor, except the Owner reserves the right to take possession of project identification signs.

END OF SECTION

SECTION 01 65 50
MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.2 DEFINITIONS

A. Definitions used in this Section are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
   1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock.
   2. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
      a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.
      b. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed or installed to form a part of the Work.
      c. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.3 MATERIALS - QUALITY ASSURANCE

A. It is the intent of these specifications to procure a quality product of the latest design by an established manufacturer.
   1. All components of systems shall be engineered for long, continuous, uninterrupted service.
   2. The cost of the equipment shall include all royalties and costs arising from patents and licenses associated with furnishing the specified equipment.

B. All materials shall be designed to withstand stresses encountered in continuous operation, fabrication and erection.

C. Material for which no Detailed Specifications are Given Shall:
   1. Meet the particular industry standard for the material used.
   2. Meet the specifications of ASTM, ANSI or SAE for metals and plastics as appropriate for the use intended.
   3. Not be used unless it has previously been used for a like purpose for a sufficient length of time in the field or under field-simulated laboratory conditions to demonstrate its successful use.

D. Source Limitations:
   1. To the fullest extent possible, provide products of the same kind from a single source.
   2. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Engineer to determine the most important product qualities to consider before proceeding.
      a. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility.
      b. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

E. Compatibility of Options:
   1. When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
   1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Provide equipment and personnel to handle products by methods that avoid soiling or damage.
   4. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   5. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that quantities are correct, products are undamaged, and properly protected.
      a. Inform the Engineer or Owner before the inspection occurs, so that they may participate in the inspection if so desired.
   6. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
      a. Seals and labels shall be intact and legible.
   7. Store products in accordance with manufacturer's instructions.
      a. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
   8. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation.
      a. Maintain temperature and humidity within range required by manufacturer's instructions.
   9. Arrange for fabricated items or products stored outside to be placed on sloped supports above the ground.
   10. Items subject to deterioration shall be covered by weatherproof sheet covering which is ventilated to prevent condensation.
   11. Store loose granular materials on solid surfaces that are well drained and prevent contamination by foreign matter.
   12. Stacked items shall be suitably protected from damage by spacers or load distributing supports that are safely arranged.
      a. No metalwork (miscellaneous steel shapes and reinforcing steel) shall be stored directly on the ground.
      b. Pipe, fittings, and valves may be stored out of doors, but must be placed on wooden blocking.
      c. Piping, geosynthetics, and other synthetic-type materials shall be stored off the ground on pallets and protected from direct sunlight or as otherwise recommended by manufacturers.
   13. Arrange for periodic inspection of stored materials to ensure that materials remain undamaged and are maintained under required conditions.
   14. All shipment, delivery and storage charges shall be at the expense of the Contractor.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements:
   1. Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
   2. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.

B. Standard Products:
   1. Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

C. Product Selection Procedures:
   1. The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
      a. Proprietary Specification Requirements:
         1) Where Specifications name only a single “Proprietary” product or manufacturer, provide the product indicated.
         2) No “or-equals” will be permitted.
      b. Where Specifications name one or more products or manufacturers:
         1) Comply with the Contract Document provisions concerning “or-equals”.
      c. Descriptive Specification Requirements:
         1) Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the listed characteristics and otherwise complies with Contract Documents.
      d. Performance Specification Requirements:
         1) Where Specifications require compliance with performance requirements, provide products that comply with listed requirements and are recommended by the manufacturer for the application indicated.
         2) Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
      e. Compliance with Standards, Codes, and Regulations:
         1) Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
      f. Visual Matching:
         1) Where Specifications require matching an established Sample, the Engineer's decision will be final on whether a proposed product matches satisfactorily.
         2) Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "or-Equal" for selection of a matching product in another product category.
      g. Visual Selection:
         1) Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements.
         2) The Engineer will select the color, pattern, and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located, and aligned with other Work.
   1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

3.2 FIELD QUALITY CONTROL

A. Inspect Deliveries:
   1. Inspect all products or equipment delivered to the site prior to unloading.
   2. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on Project.

B. Qualifications of Manufacturer’s Field Personnel:
   1. Personnel shall be authorized by the manufacturer to erect, start-up and initiate warranty of the Product provided.
      a. Personnel shall come to the site with the required tools and instruments.
      b. Personnel shall have full knowledge of Product to be furnished.
   2. Failure to provide personnel with full qualifications shall be cause for service trip to be disqualified as part of the requirements and may be cause for reimbursement for costs incurred by the Owner due to services required for a qualified start-up inspection.

END OF SECTION

SECTION 01 71 23
FIELD ENGINEERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Engineering surveys provided by the Owner's Representative or Quality Assurance Consultant.
   2. Engineering surveys provided by the Contractor.
   3. Profile and topography shown on the Drawings.
   4. Record measurements and markers.

1.2 SUBMITTALS

A. Provide record measurements of facilities, preconstruction conditions, liner components, leachate lines, gas collection lines, groundwater controls, roads, surfacing, utilities, and structures, as installed.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 PREPARATION

A. Investigate and verify the existence and location of site improvements, utilities, and other existing facilities.

B. Before construction, verify the location of:
   1. Invert elevations at points of connection of leachate lines, gas collection lines, storm sewer, and underground electrical services.
   2. Existing liner system at new cell coordinate boundaries as identified on Drawings.

C. Furnish information to the Engineer and the appropriate utility regarding conflicts that are necessary to adjust, move, or relocate existing utility structures, lines, services, or other utility appurtenances located in or affected by construction.

3.2 ENGINEERING SURVEYS PROVIDED BY THE OWNER'S REPRESENTATIVE

A. Prior to the start of construction, Owner will be responsible to establish or verify benchmarks for construction, at the locations shown on the Drawings or in the general vicinity of the Work.

B. Prior to start of construction, Owner will be responsible to undertake surveys or estimates required to establish basis of Unit Price Work, if necessary.

C. Quality Assurance surveys as Owner deems necessary to document compliance.

D. After the award of the Contract the Owner will, for Contractor's convenience, provide an electronic copy of the proposed Base Grades in AutoCAD (DWG) release 2020.
   1. This will be provided for convenience only and will not be considered a part of the Contract Documents.
   2. See General Conditions related to discrepancies between printed and electronic files and reuse of documents.
   3. Elevations will require adjustment based on actual construction.

3.3 ENGINEERING SURVEYS TO BE PROVIDED BY THE CONTRACTOR

A. General:

1. Provide, locate, preserve and protect established construction reference stakes, benchmarks and control points.
2. Locate, preserve and protect property corners and section corner monuments.
    a. If moved or destroyed due to Contractor activities, then replace in accordance with applicable regulations or requirements.
3. Provide additional construction staking as necessary to layout and complete construction.
4. Before beginning construction staking, verify the information shown on the Drawings or provided by the Owner's Representative, in relation to the established construction reference stakes, benchmarks, control points and property corners.
    a. Notify the Engineer of any discrepancies.
5. Remove Contractor installed construction reference stakes when directed by the Engineer.
6. Owner will provide a survey reference table for Contractor's convenience in establishing a clear and consistent survey point numbering system.
    a. This table shall not be construed as all-inclusive or as modifying Contractor's contractual survey requirements in any way.

B. Prior to the start of construction, Contractor will be responsible to complete a preconstruction survey in all anticipated work areas and provide to the Owner's Construction Quality Assurance Representative.

C. Gravity and Pressure Pipeline Systems:
1. Provide any intermediate construction reference points required to verify installation at the line and grade established and locate appurtenant structures.
2. Check the line and grade with the construction reference stakes at each pipe length.

D. Recompacted Clay Liner, HDPE Geomembrane Liner, and Drainage Layer:
1. Provide any intermediate construction reference points required to verify installation at the line and grade established and locate appurtenant structures.
2. Complete thickness verification surveying at testing grid (100-ft grid for each point) plan provided by Engineer. Testing grid will be provided following Contractor's verification and submittal of existing liner system tie-in points.

E. Structural Fill, Controlled Fill, and Embankments:
1. Provide any intermediate construction reference points required to verify installation at the line and grade established and locate appurtenant structures.

F. Site Improvements:
1. Provide construction reference stakes for site improvements including roadways, (roadways, aggregate surfacing, grading, fill and topsoil placement, terraces, diversion berms, and utility lines, equipment racks, and grades.
2. Provide construction reference stakes for location and elevations of structures.

3.4 PROFILE AND TOPOGRAPHY SHOWN ON THE DRAWINGS

A. Contours, profiles, or points of the ground are shown on the Drawings.
1. These profiles and contours are reasonably correct, but are not guaranteed to be absolutely so, and together with any schedule of quantities are presented only as an approximation.
2. See also notes on Drawings for features not in contours or profiles.

3.5 RECORD MEASUREMENTS AND MARKERS

A. Provide record survey information of the as-constructed facilities showing the exact horizontal and vertical location of liner components, leachate lines, drain lines, storm water lines, buried utilities, structures, stabilization measures, and other facilities that are covered when construction is complete.

B. Contractor shall provide Owner the as-constructed survey contours conforming to the project coordinate system identified on the Contract Drawings in AutoCAD (DWG) release 2020 compatible x, y, z format, as well as DWF format and digital terrain model (DTM).

C. Record Drawings shall include information based on field surveys (x, y, z) for the following improvements, at a minimum:
   1. Limits of excavation of liner system subgrade and components.
   2. Elevation contours for the completed area(s), including bulk excavation and soil placement areas, liner and leachate/gas collection layers.
   3. Provide construction coordinates for Recompacted Clay Liner, subgrade (Base Grade), drainage layer, and finished grade at a minimum of 100 FT intervals, at all changes in grades and at coordinate points shown on the Drawings.
   4. Provide construction coordinates for HDPE geomembrane at a minimum of 100 FT intervals, at all corners and anchor points, at all changes in grades and at coordinate points shown on the Drawings, including HDPE geomembrane liner layout with seams, repairs, test samples, and anchor points.
   5. Berm alignment and elevation.
   6. Elevations and horizontal locations for all piping, drains, cleanouts, risers, and structures (where required to be installed), including where piping changes in vertical and/or horizontal direction or elevation occur.
   7. Erosion/sedimentation control systems.
   8. Limits of aggregate including vertical and horizontal locations for all related improvements (where required to be installed).
   9. Other improvements related to the Work as shown on the Drawings.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 71 24
GEOMEMBRANE ELECTROSTATIC LEAK LOCATION SURVEY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Preparing the bottom liner geomembrane liner system for an electrostatic leak location survey.
   2. Drainage layer wetting in support of electrostatic leak location survey.
   3. Making repairs to the geomembrane liner system at locations identified by the leak location survey.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 33 34 61 - High Density Polyethylene (HDPE) Geomembrane Liner.

1.2 QUALITY ASSURANCE

A. Certification:
   1. Certify and document that all defect locations identified during the geomembrane electrostatic leak location survey have been repaired in accordance with the applicable Specifications.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 SITE PREPERATION

A. The geomembrane electrical leak location survey will be conducted by the Owner after the drainage layer and coarse aggregate for the landfill liner is essentially completely placed over the geotextile and HDPE geomembrane on the floor area.
   1. Testing will be completed on Metro Park West Cell D Liner.

B. Leave exposed geomembrane strip around entire perimeter of cell coordinate boundary to provide electrical isolation of the new HDPE geomembrane liner system and accommodate testing.
   1. For areas with liner transitions to existing liner systems: Leave a gap 3 FT to 5 FT wide in drainage layer, coarse aggregate, protective soil, or structural fill, and geotextile at liner transition areas.
   2. For areas with temporary liner terminations – perform one of the following:
      a. Same as for areas with liner transitions to existing liner systems.
      b. Prior to completion of liner system temporary termination berms, and without any loss of effectiveness to liner system ballasting, leave a minimum of 2 FT and maximum of 3 FT of HDPE geomembrane liner overbuild exposed outside the cell coordinate boundary.
   3. For areas with liner anchor trench terminations: Continuously extend the HDPE geomembrane beyond the outside the edge of the backfilled anchor trench so that a minimum of 1 FT and maximum of 3 FT HDPE geomembrane flap is exposed above ground. Refer to Drawings for additional description.

C. Anticipate a minimum of three (3) and a maximum of five (5) calendar days to complete the leak location survey.
   1. Allow for all time necessary to complete the leak location survey including repairs to the geomembrane liner, geotextile and installation of soil and stone covers.

D. Contractor to provide a generator and fuel to provide power to the leak location survey equipment.

3.2 DRAINAGE LAYER WETTING

A. Provide resources necessary to completely wet the cell drainage layer in support of electrostatic leak location testing, and at the direction of Owner, Engineer, or Owner's Leak Location Contractor.
   1. Historically, drainage layer wetting for an approximate 11 acre cell has required two (2) 4,500 GAL water trucks, four (4) full-time personnel dedicated to spraying water, and four (4) water hoses capable of reaching across entire length of cell liner.
   2. Anticipate a minimum of three (3) and a maximum of five (5) calendar days to complete drainage layer wetting.
   3. Contractor's required commitment of resources may be diminished dependent on the occurrence of precipitation during the time of electrostatic leak location testing.

3.3 LEAK REPAIRS

A. The Owner's Leak Location Contractor will verify conditions of the area(s) to be tested prior to conducting the test.
   1. Make any preparations to the area(s) required by the Leak Location Contractor.

B. The Owner's Leak Location Contractor will mark the locations of indicated leaks.

C. If the leak location survey identifies damage, holes, or leaks in the HDPE geomembrane liner, the Contractor is responsible for all work and costs necessary to expose the geotextile and geomembrane liner, repair the geotextile and liner, and reconstruct the necessary layers of the liner, and overlying materials.
   1. All repairs shall be made in accordance with the Section of the Specifications related to the material impacted by the repair operations.
   2. Repairs shall be made at no additional cost to the Owner.

3.4 COMPLETION OF LINER SYSTEM

A. Completion of the geotextile, drainage layer, leachate collection pipes, gas collection pipes, coarse aggregate, protective soil, or structural fill placement to be completed following successful completion of the leak location survey.
   1. Refer to Drawings for details related to required construction sequence, timing, and Contractor responsibilities.

END OF SECTION

SECTION 01 73 29
DEMOLITION, ABANDONMENT, REMOVAL AND SALVAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Demolition or removal of select structures, equipment, and site features.
   2. Removal and salvage of select elements.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 - General Requirements.
   3. Section 31 10 00 - Site Clearing and Preparation.

1.2 DEFINITIONS

A. Remove:
   1. The partial or complete removal and disposal of designated existing elements of construction.
   2. When the term "Remove," is used in the Specifications or on the Drawings, it shall grant the Contractor the following options for material management, as stipulated further in this Specification:
      a. Remove, handle and transport to off-site facilities for reuse or recycling at Contractor's sole discretion and expense.
      b. Remove, handle, transport and dispose on-site at active landfill area.

B. Protect: Action or activities required to ensure the integrity of structures affected by removal, demolition, abandonment or relocation activities such that they will remain undamaged and functional in subsequent construction.

C. Remove and Relocate or Remove and Salvage:
   1. The careful and complete removal of a designated existing element of construction.
   2. When the terms "Remove and Relocate", "Remove and Salvage" or "Salvage," are used in the Specifications or on the Drawings, they shall obligate the Contractor's best efforts to reclaim material in an undamaged manner and carefully stockpile or reuse it at a location designated by the Owner.
      a. Damaged material which in the Owner’s or Engineer’s judgment does not permit salvage or reuse may be disposed at the active landfill area.
   3. Material that has been salvaged may be utilized in subsequent construction provided:
      a. Condition of material is undamaged and all related contaminates have been removed.
      b. This option shall only extend to inorganic material.
   4. Culvert pipe and flared end section may be re-used, provide they meet criteria for re-use.
      a. All banding, gaskets, jointing and related assemblies must be new construction.
      b. Coatings must be repaired.
      c. Pipe sections which are modified by cutting shall be protected from corrosion as indicated in Section 33 40 00.

D. The terms defined above shall convey the same intent whether used in the form of nouns, verbs or various tenses.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 REMOVE AND SALVAGE MATERIALS

A. Undamaged prior to removal or as a result of removal action and subsequent reuse:
   1. Contractor shall verify functional integrity of elements designated for "remove and salvaged" prior to removal.
   2. If removal represents a risk for damage or in-place material is deemed damaged, Contractor shall notify Engineer and Owner to obtain concurrence that salvage may not be viable without loss of integrity.
   3. If functional integrity of elements scheduled for "remove and salvage" are subsequently compromised, Contractor shall replace elements at Contractor's cost.

B. Suitable and compatible with new installation.

3.2 SALVAGE MATERIALS AND STOCKPILE

A. Stormwater Pipe and Drainage Structures:
   1. Carefully excavate to avoid damage.
   2. Separate pipe and flared end sections at banded joints.
      a. Dispose of banding and couplers.
   3. Handle pipe to avoid damage.
      a. Do not cut holes or weld-on lifting hooks.
      b. Stockpile salvaged materials at location designated by Owner.

B. Existing Groundwater Risers:
   1. Remove and relocate Ground Water Risers indicated on Drawings.

C. Litter and Security Fence:
   1. Separate fabric from posts and rails; roll without tangling.
      a. Salvage fabric.
      b. Properly dispose of banding, couplers and other non-salvaged items.
      c. Terminate fabric at remaining fence with tension bars, bracing and banding similar to new fence.
   2. At all terminations ends of existing fence, install new brace between final two remaining posts to brace remaining fence.
   3. Salvage rails, posts and foundations.
      a. Do not cut off posts or rails.
      b. Salvage includes removal of concrete foundations.
         1) Concrete not attached to posts shall be excavated and disposed.
         2) Backfill all holes resulting from foundation removal.
      c. Salvage caps and bracing.
   4. Handle fence fabric and members to avoid damage.
      a. Stockpile salvaged materials at location designated by Owner.

D. Miscellaneous Materials:
   1. Material removed as a part of relocation of existing structures, which is functionally usable or reusable shall be removed in a manner that will prevent damage.
   2. For material not deemed re-usable:
      a. Prior to onsite disposal or off-site re-use and recycling, Contractor shall offer the Owner the option of salvage.

E. Stockpile:
   1. Stockpile salvaged material on-site in areas designated by Owner or Engineer.
      a. Stockpile in a neat and orderly fashion.
      b. To the extent possible stockpile above ground to avoid degradation.
   2. Segregate dissimilar material in separate stockpiles.

3.3 ITEMS FOR REMOVAL OR DEMOLITION

A. General:
   1. Items or materials designated for removal or demolition shall be managed or disposed of on-site in accordance with applicable laws.

B. See also Section 31 10 00 on material disposal.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 77 01
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion.
   2. Final Completion.
   3. Project Record Documents.
   4. Warranties.
   5. Instruction of Owner's personnel.
   6. Final Cleaning.

1.2 SUBSTANTIAL COMPLETION

A. Before notifying Owner and Engineer that the Work is Substantially Complete, undertake the following:
   1. Demonstrate to the Engineer that systems and system components operate as intended.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents, as appropriate.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, Engineering Surveys and Record Measurements and Markers as required by Section 01 71 23, and similar final record information.
   6. Deliver any specified tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   7. Advise Owner's personnel of changeover in security provisions.
   8. Complete startup testing of systems.
   9. Submit any specified test/adjust/balance records.
      a. Coordinate and conduct an operating test of the completed systems and components of their work under normal full operating conditions of use.
      b. Make adjustments and replacements necessary to bring all work into compliance with the Contract Documents; all applicable codes, regulations and laws; and system manufacturer requirements.
      c. Operating systems and equipment shall be adjusted to provide smooth, unhindered operation satisfactory to the Owner.
   10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
   12. Complete final cleaning requirements, including touchup painting, including a thorough cleaning, of all work as appropriate to remove all foreign matter, spots, stains, and soil so as to put all work in a complete and finished condition.
   13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
   14. Cleaning and touch up shall be repeated as necessary until final completion of all punch list items.

15. Exterior cleaning shall include washing down and sweeping of all paved areas and removal of all trash and debris from the site.

B. After Owner acceptance, costs incurred by the Owner for cleaning attributable to work of the Contract will be charged to the Contractor.

C. Submit written notification to Owner and Engineer that the entire Work is ready for its intended use and the entire Work is substantially complete.
   1. If the items in Paragraph A. above are complete, then within 14 days Owner, Contractor and Engineer will make an inspection of the Work to determine status of completion.
   2. If Engineer considers the Work substantially complete, then Engineer will prepare and deliver to the Owner a tentative Certificate of Substantial Completion fixing the date of Substantial Completion with an attached tentative list of items to be completed or corrected before final payment.
   3. Engineer will issue a definitive Certificate of Substantial Completion with list of items to be completed or corrected or notify Contractor that the Work is not substantially complete within 21 days after submittal to Owner.
   4. The Contractor shall request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
   5. Results of completed inspection will form the basis of requirements for Final Completion.
   6. Costs associated with reinspections by the Engineer due to the work not meeting Substantial Completion requirements after Contractor notification shall be charged to the Contractor.
      a. See Supplementary Condition SC15.03.B.

1.3 FINAL COMPLETION

A. Preliminary Procedures:
   1. Before requesting final inspection for certification of final payment, complete the following:
      a. Submit a list of items identified as requiring correction or completion.
         1) List exceptions in the request.
      b. Instruct Owner's personnel in operation, adjustment and maintenance of products, equipment and systems in accordance with the Contract Document requirements.
      c. Submit the final payment request with releases and supporting documentation not previously submitted and accepted.
         1) Include insurance certificates for products and completed operations where required.
      d. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
      e. Submit a written notice that the work is complete including a certified copy of the Engineer's final inspection list of items to be completed or corrected, endorsed and dated by the Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Engineer.
         1) On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements.
      f. Submit consent of surety to final payment.
      g. Submit a final liquidated damages settlement statement.
      h. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
      i. Submit Project Record Documents, Record Measurements and Markers, Drawings, Project Manual, Operation and Maintenance Manuals, product test data and similar final record information.
      j. Deliver tools, spare parts, extra stock and similar items.

B. Reinspection Procedure:
   1. The Engineer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Owner and Engineer.

2. Upon completion of reinspection, the Engineer will prepare a certificate of final acceptance. If the work is incomplete, the Engineer will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
3. If necessary, reinspection will be repeated.
    a. Costs associated with reinspections by the Engineer due to the work not meeting Final Completion requirements, after Contractor notification, shall be charged to the Contractor.
    b. See Supplementary Condition SC15.03.B.

1.4 PROJECT RECORD DOCUMENTS

A. General:
1. Do not use Record Documents for construction purposes.
2. Protect Record Documents from deterioration and loss in a secure, fire-resistant location.
3. Provide access to Record Documents for Engineer's reference during normal working hours.
4. See Section 01 71 23.

B. Record Drawings:
1. Furnish a complete set of Construction Document Drawings to be utilized by Contractor and all Subcontractors for recording all changes and variations from the Original Drawings and Shop Drawings.
    a. Mark the set to show the actual installation where the installation varies from the work as originally shown.
    b. Mark which Drawing is most capable of showing conditions fully and accurately.
    c. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings.
        1) Give particular attention to concealed elements that would be difficult to measure and record at a later date.
2. Mark record sets with red erasable pencil.
    a. Use other colors to distinguish between variations in separate categories of the work.
3. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
4. Note related Change Order numbers where applicable.
5. Organize Record Drawing sheets into manageable sets.
    a. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
6. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
7. Identify and date each Record Drawing; include designation "PROJECT RECORD DRAWING" in a prominent location.
8. Upon completion of the Work submit Record Drawings to the Engineer for the Owner's records.

C. Record Specifications:
1. Furnish a copy of the Project Manual for recording changes.
    a. Mark these documents to show substantial variations in actual work performed in comparison with the text of the Specifications and modification.
    b. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
    c. Note related Record Drawing information and product data.
    d. Identify and date Record Specification; include "PRODUCT RECORD SPECIFICATION" in a prominent location.
    e. Upon completion of the work, submit record specifications to the Engineer for the Owner's records.

D. Record Product Data: Furnish one copy of each product data submittal. Note related Change Orders and markup of Record Drawings and Record Specifications.
   1. Mark these documents to show significant variations in actual work performed in comparison with information submitted.
      a. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
   2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
   3. Upon completion of markup, submit complete set of Record Product Data to the Engineer for the Owner's records.

E. Record Sample Submitted:
   1. Immediately prior to Substantial Completion, the Contractor shall meet with the Engineer and the Owner's personnel at the project site to determine which samples are to be transmitted to the Owner for record purposes.
   2. Comply with the Owner's instructions regarding delivery to the Owner's sample storage area.

F. Miscellaneous Record Submittals:
   1. Refer to individual specification sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work.
   2. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order.
   3. Identify miscellaneous records properly and bind or file, ready for continued use and reference.
   4. Submit to the Engineer for the Owner's records.

1.5 WARRANTIES

A. Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Submit properly executed warranties of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 1/2 by 11 IN (115-by-280-mm) paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty.
      a. Mark tab to identify the product or installation.
      b. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General:
   1. Conduct final cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning:
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
      b. Sweep paved areas broom clean.
      c. Remove petrochemical spills, stains, and other foreign deposits.
      d. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
      e. Remove tools, construction equipment, machinery, and surplus material from Project site.
      f. Remove all sediment from erosion control structures.
      g. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances.
      h. Remove debris and surface dust from limited access spaces, including vaults, manholes, pipes, and similar spaces.
      i. Sweep concrete floors broom clean in unoccupied spaces.
      j. Remove labels that are not permanent.
      k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces.
         1) Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
         2) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
      l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
      m. Replace parts subject to unusual operating conditions.
      n. Leave Project clean and ready for occupancy.

C. Comply with Safety Standards for Cleaning:
   1. Do not discharge volatile, harmful, or dangerous materials on the site.
   2. Properly and lawfully dispose of waste materials from Project site.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

DIVISION 02

EXISTING CONDITIONS

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02 65 00
SOILS TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Soil testing as required to establish compliance with earthwork specifications and Contract Documents.
   2. The Contractor shall conduct prequalification tests prior to furnishing off-site materials and prior to material placement.
   3. Prequalification tests to verify compliance with required material properties as described herein.
   4. Compliance tests to verify compliance with specifications described herein and in compliance with the Construction Quality Assurance Plan within Appendix A of the Specifications.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 01 71 23 - Field Engineering.
   4. Section 31 23 00 - Earthwork.
   5. Section 01 71 24 - Geomembrane Electrical Leak Location Survey.
   6. CQA Plan.

1.2 RESPONSIBILITY AND PAYMENT

A. Contractor provides and pays for certain soil testing services as specified herein:
   1. Contractor:
      a. Retain the services of a Testing Agency to perform testing services for the following:
         1) Testing of off-site and granular materials for prequalification and compliance with the Contract Documents.
         2) Prequalification testing of proposed soil for use in Recompacted Clay Liner.
         3) Additional testing or retesting of materials which fail to meet Specification.
         4) In-place testing as specified to confirm thickness and compliance.
         5) Production control soil testing if required to control quality of work.

B. Owner to provide testing described in Section 01 71 24, CQA Plan, and other on-site testing required for quality assurance.

C. Provide for Owner testing and assist where necessary in obtaining samples or preparing areas for testing.

1.3 QUALITY ASSURANCE

A. Referenced Standards:
   1. Comply with applicable sections of the following reference standard(s) with respect to materials, workmanship, construction, and testing methods.
   2. ASTM International (ASTM):
      a. C117, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.
      b. C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
      c. D422, Standard Test Method for Particle-Size Analysis of Soils.
      d. D698, Tests for the Moisture Density Relations of Soils and Soil Aggregate Mixtures Using a 5.5 LB Rammer and a 12 IN Drop.

e. D1140, Standard Test Method for Materials Finer than 75 MM (No. 200) Sieve in Mineral Aggregate by Washing.
f. D2216, Test Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixture.
g. D2217, Practice for Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
h. D2434, Standard Test Method for Permeability of Granular Soils (Constant Head).
i. D4318, Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
j. D4643, Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method.

3. Iowa Department of Transportation (IDOT):
   a. Standard Specifications for Highway and Bridge Construction.
   b. Test Method 408-A, Durability: Soundness.

1.4 DEFINITIONS

A. Testing Agency:
   1. An independent professional testing firm or service hired by Contractor, and acceptable to the Owner, to perform testing and analysis services on materials, as provided in the Contract Documents.
   2. The name and qualifications of the Testing Agency are to be presented in Contractor's list of subcontractors.

B. Prequalification Testing:
   1. The Contractor's Testing Agency shall perform materials testing and analysis of on and off-site granular borrow soils to be used in the construction.
   2. This testing and analysis shall be performed on soils and reported to Engineer prior to being incorporated into the work or transported to the project site.

C. Production Control and Compliance Testing:
   1. The Contractor's Testing Agency shall perform materials testing and analysis on soil placed and compacted to verify property requirements described herein.

1.5 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00.
   2. Soil test data for prequalification testing of each layer shall be submitted to the Engineer at least 14 days prior to its intended use on the project.
   3. Concrete test results including:
      a. Slump.
      b. Air Content.
      c. Temperature.
      d. Strength.
   4. Soil data for prequalification testing shall consist of:
      a. Drainage Layer and Coarse Aggregate:
         1) Soil classification.
         2) Percent fines (passing No. 200 sieve).
         3) Grain size distribution and certification of compliance.
         4) Soundness in accordance with IDOT methods.
         5) Hydraulic conductivity.
      b. Field logs and locations of test excavations for off-site borrow soils noting:
         1) Depth.
         2) Soil type.
         3) Test sample locations.
         4) Total layer thickness.
         5) Other pertinent data.
      c. On-site borrow soils for use in recompacted clay liner (base liner) and structural fill:

1) Atterberg Limits.
2) Visual Classification.
3) Percent fines (passing No. 200 sieve).
4) Moisture-density relationship (recompacted clay liner and structural fill only).
5) Hydraulic conductivity (recompacted clay liner only).

5. Soil test data for compliance testing shall consist of:
   a. Recompacted Clay Liner:
      1) Atterberg Limits.
      2) % Fines.
      3) Moisture-Density Relationship
      4) In-Place Measured Density and Moisture Content
   b. Granular Drainage Layer:
      1) Sieve analysis.
      2) % Fines.
      3) Aggregate Soundness.
      4) Hydraulic Conductivity.
   c. Coarse Aggregate:
      1) Sieve analysis.
      2) % Fines.
   d. Total thickness, as determined by Contractor survey:
      1) Drainage layer and coarse aggregate above HDPE Geomembrane.
      2) Recompacted clay liner.
      3) Structural fill.
      4) Roadway aggregate and surface coarse.
   e. Additional Contractor surveying beyond that identified in Section 01 71 23 may be used to complement thickness measurements.
   f. Excavations or borings in lieu of Contractor surveying at the sole discretion of Owner's Representative.
6. Contractor’s prequalification and compliance testing shall at a minimum meet the required frequencies of Appendix A within the CQA Plan within the Contract Documents.
7. All soil samples shall be held by Contractor's Testing Agency under constant moisture conditions for a minimum of 45 days after final submittal and approval of test results.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 SERVICES TO BE PERFORMED BY TESTING AGENCY

A. Evaluate and test Contractor's proposed materials for compliance with the Contract Documents prior to incorporation in the Work.
   1. Submit results no later than 14 days prior to its proposed use at the site.

B. Prepare samples for Atterberg Limits and grain size analysis testing using ASTM D2217.

C. Conduct tests on soils for percentage of fines (passing No. 200 sieve) using ASTM D1140 (fine grained soils) or ASTM C117 (granular soils) and grain size distribution using ASTM D422 (fine grained soils) or ASTM C136 (granular soils).

D. In-place moisture and density, grain size, and other properties on material after placement and compaction.

E. Conduct moisture content tests on soils using ASTM D2216 or ASTM D4643.

F. Conduct hydraulic conductivity testing using ASTM D5084 on selected samples of the recompacted clay liner.

G. Conduct hydraulic conductivity testing using ASTM D2434 on selected samples of the granular drainage layer and coarse aggregate.

3.2 FREQUENCY OF TESTING

A. The following types and frequency of prequalification and compliance testing shall be performed on each material and changed material type to be used for each soil layer:
   1. Drainage Layer and Coarse Aggregate non-calcareous (Leachate Collection):

PARAMETER	TEST METHOD	FREQUENCY
Grain Size Distribution (drainage layer only)	ASTM C136	1 per 1,500 CY
Percent Fines (coarse aggregate only)	ASTM D422	1 per 1,500 CY
Hydraulic Conductivity	ASTM D2434	1 per source
Aggregate Soundness (drainage layer only)	ASTM C88	1 per source

   2. On-site soils used for Recompacted Clay Liner and Structural Fill:

PARAMETER	TEST METHOD	FREQUENCY
Prequalification Testing		
Atterberg Limits	ASTM D4318	1 per material type
Visual Classification	ASTM D2488	1 per material type
Percent Fines	ASTM D1140	1 per material type
Moisture Content	ASTM D2216 or D4643	1 per material type
Moisture-Density Relationship	ASTM D698 or D1557	1 per material type
Hydraulic Conductivity (Recompacted Clay Liner only)	ASTM D5084	1 per material type
Compliance Testing		
Atterberg Limits	ASTM D4318	1 per 1,000 CY
% Fines	ASTM D6913, ASTM D7928	1 per 1,000 CY
Moisture-Density Relationship	ASTM D698 or ASTM D1557	1 per 10,000 CY or as soil type changes
Density	ASTM D2922, D1587, D2167, or D1556	5 tests per acre per 6-IN lift
Water Content	ASTM D3017 or D2216	5 tests per acre per 6-IN lift
Hydraulic Conductivity	ASTM D5084	1 Test Per Acre

   3. Owner's CQA Consultant will provide a testing quadrant map broken into 1/5 acres for testing documentation. Density and water content test locations on the recompacted clay liner will be identified by Owner's CQA Consultant/Engineer.
   4. Perimeter Access Road and Phase 2 Access Road:
      a. Subgrade surface shall be compacted to specifications required for Structural Fill.

b. Proofroll the exposed subgrade with a loaded tandem-axle dump truck weighing at least 34,000 LBS.
   1) Operate trucks at less than 10 MPH.
c. Contractor's Testing Agency will observe proofrolling and define the acceptability of subgrade as well defining the extent of unsuitable soils.
d. Owner's Quality Assurance Consultant shall be given the opportunity to observe subgrade proofrolling and to inspect subgrade below fill material both prior to and after subgrade compaction or stabilization.
e. Unstable or unsuitable soils which are revealed by proofrolling, remove and replace with new compacted Structural Fill.

5. Additional tests should be performed on any suspect material observed by the Contractor or Engineer's Field Representative.
6. Frequency based on material meeting pre-qualifications.
   a. Perform additional tests if prequalification requirements are not satisfied.
7. Certain tests may be performed after soil type and suitability are established by other test methods.

3.3 OTHER TESTING SERVICES TO BE PERFORMED BY TESTING AGENCY AS NEEDED

A. Following services to be performed by Testing Agency when necessary, at no additional cost to Owner:
   1. Additional soil testing as required by Construction Quality Assurance Plan (see Appendix A of Plan). Contractor shall be responsible for quality control and quality assurance testing.
   2. Additional testing and inspection required because of changes or rejection of materials.
   3. Production quality control testing as Contractor may require for effective production of the Work.

3.4 DUTIES AND AUTHORITIES OF TESTING AGENCY

A. Testing Agency is to inspect, sample and test materials as required by these Contract Documents.
   1. Testing Agency to report all test and inspection results to Engineer and Contractor immediately after they are performed.

B. When it appears that any material furnished or work performed by Contractor fails to fulfill requirements of the Contract Documents, Testing Agency is to test suspect materials and to report findings to Engineer and Contractor.
   1. All test reports to include exact location and depth from which the material was taken and/or location of samples selected from in-place materials.

C. Limited Authority of Testing Agency:
   1. Any Testing Agency or agencies and their representatives retained by Contractor are not authorized to revoke, alter, relax, enlarge, or release any requirement of Contract Documents, nor to reject, approve or accept any portion of the Work.

3.5 RESPONSIBILITIES AND DUTIES OF CONTRACTOR

A. Provide necessary testing services for prequalification of proposed materials and compliance testing upon placement.

B. Use of Testing Agency and results of tests on proposed materials shall in no way relieve Contractor of responsibility to furnish materials and construction in full compliance with Contract Documents.

C. To facilitate testing and inspection, perform the following:
   1. Furnish any necessary labor to assist the Testing Agency in obtaining and handling samples at site or other sources of materials.
   2. Provide the Testing Agency adequate notice to obtain samples, test and report results prior to time of material placement.

END OF SECTION

DIVISION 10

SPECIALTIES

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 10 14 00
IDENTIFICATION DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Tag, tape and stenciling systems for equipment, piping and similar items, and hazard and safety signs.

B. Related Specification Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Society of Mechanical Engineers (ASME):
      a. A13.1, Scheme for the Identification of Piping Systems.
   2. The International Society of Automation (ISA).
   3. National Electrical Manufacturers Association/American National Standards Institute (NEMA/ANSI):
      a. Z535.1, Safety Color Code.
      b. Z535.2, Environmental and Facility Safety Signs.
      c. Z535.3, Criteria for Safety Symbols.
      d. Z535.4, Product Safety Signs and Labels.
   4. National Fire Protection Association (NFPA):
      a. 70, National Electrical Code (NEC).
   5. Occupational Safety and Health Administration (OSHA):
      a. 29 CFR 1910.145, Specification for Accident Prevention Signs and Tags.

1.3 SUBMITTALS

A. Shop Drawings:
   1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
   2. Product technical data including:
      a. Catalog information for all identification systems.
      b. Acknowledgement that products submitted meet requirements of standards referenced.
   3. Identification register, listing all items in PART 3 of this Specification Section to be identified, type of identification system to be used, lettering, location and color.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
   1. W.H. Brady Co.
   2. Panduit.
   3. Seton.
   4. National Band and Tag Co.
   5. Carlton Industries, Inc.

B. Submit request for substitution in accordance with Specification Section 01 25 13.

2.2 MANUFACTURED UNITS

A. Type A1 - Round Metal Tags:
   1. Materials:
      a. Aluminum or stainless steel.
      b. Stainless steel shall be used in corrosive environments.
   2. Size:
      a. Diameter: 1-1/2 IN minimum.
      b. Thickness: 0.035 IN (20 GA) minimum.
   3. Fabrication:
      a. 3/16 IN minimum mounting hole.
      b. Legend: Stamped and filled with black coloring.
   4. Color: Natural.

B. Type A2 - Rectangle Metal Tags:
   1. Materials: Stainless steel.
   2. Size:
      a. 3-1/2 IN x 1-1/2 IN minimum.
      b. Thickness: 0.036 IN (20 GA) minimum.
   3. Fabrication:
      a. 3/16 IN minimum mounting hole.
      b. Legend: Stamped and filled with black coloring.
   4. Color: Natural.

C. Type A3 - Metal Tape Tags:
   1. Materials: Aluminum or stainless steel.
   2. Size:
      a. Width 1/2 IN minimum.
      b. Length as required by text.
   3. Fabrication:
      a. 3/16 IN minimum mounting hole.
      b. Legend: Embossed.
   4. Color: Natural.

D. Type B1- Square Nonmetallic Tags:
   1. Materials: Fiberglass reinforced plastic.
   2. Size:
      a. Surface: 2 x 2 IN minimum.
      b. Thickness: 100 MILS.
   3. Fabrication:
      a. 3/16 IN mounting hole with metal eyelet.
      b. Legend: Preprinted and permanently embedded and fade resistant.
   4. Color:
      a. Background: Manufacturer standard or as specified.
      b. Lettering: Black.

E. Type B2 - Nonmetallic Signs:
   1. Materials: Fiberglass reinforced or durable plastic.
   2. Size:
      a. Surface: As required by text.
      b. Thickness: 60 MILS minimum.
   3. Fabrication:
      a. Rounded corners.
      b. Drilled holes in corners with grommets.
      c. Legend: Preprinted, permanently embedded and fade resistant for a 10 year minimum outdoor durability.
   4. Color:
      a. Background: Manufacturer standard or as specified.

b. Lettering: Black.

5. Standards for OSHA signs: NEMA/ANSI Z535.1, NEMA/ANSI Z535.2, NEMA/ANSI Z535.3, NEMA/ANSI Z535.4, OSHA 29 CFR 1910.145.

F. Type C - Laminated Name Plates:
   1. Materials: Phenolic or DR (high impact) acrylic.
   2. Size:
      a. Surface: As required by text.
      b. Thickness: 1/16 IN.
   3. Fabrication:
      a. Outdoor rated and UV resistant when installed outdoors.
      b. Two (2) layers laminated.
      c. Legend: Engraved through top lamination into bottom lamination.
      d. Two (2) drilled side holes, for screw mounting.
   4. Color: Black top surface, white core, unless otherwise indicated.

G. Type D - Self-Adhesive Tape Tags and Signs:
   1. Materials: Vinyl tape or vinyl cloth.
   2. Size:
      a. Surface: As required by text.
      b. Thickness: 5 MILS minimum.
   3. Fabrication:
      a. Indoor/Outdoor grade.
      b. Weather and UV resistant inks.
      c. Permanent adhesive.
      d. Legend: Preprinted.
      e. Wire markers to be self-laminating.
   4. Color: White with black lettering or as specified.
   5. Standards for OSHA signs: NEMA/ANSI Z535.1, NEMA/ANSI Z535.2, NEMA/ANSI Z535.3, NEMA/ANSI Z535.4, OSHA 29 CFR 1910.145.

H. Type E - Heat Shrinkable Tape Tags:
   1. Materials: Polyolefin.
   2. Size: As required by text.
   3. Fabrication:
      a. Legend: Preprinted.
   4. Color: White background, black printing.

I. Type F - Underground Warning Tape:
   1. Materials: Polyethylene.
   2. Size:
      a. 6 IN wide (minimum).
      b. Thickness: 3.5 MILS.
   3. Fabrication:
      a. Legend: Preprinted and permanently imbedded.
      b. Message continuous printed.
      c. Tensile strength: 1750 PSI.
   4. Color: As specified.

J. Type G - Stenciling System:
   1. Materials:
      a. Exterior type stenciling enamel.
      b. Either brushing grade or pressurized spray can form and grade.
   2. Size: As required.
   3. Fabrication:
      a. Legend: As required.
   4. Color: Black or white for best contrast.

2.3 ACCESSORIES

A. Fasteners:
   1. Bead chain: #6 brass, aluminum or stainless steel.
   2. Plastic strap: Nylon, urethane or polypropylene.
   3. Screws: Self-tapping, stainless steel.
   4. Adhesive, solvent activated.

2.4 MAINTENANCE MATERIALS

A. Where stenciled markers are provided, clean and retain stencils after completion and include in extra stock, along with required stock of paints and applicators.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Install identification devices at specified locations.

B. All identification devices to be printed by mechanical process, hand printing is not acceptable.

C. Attach tags to equipment with sufficient surface or body area with solvent activated adhesive applied to back of each tag.

D. Attach tags with 1/8 IN round or flat head screws to equipment without sufficient surface or body area, or porous surfaces.
   1. Where attachment with screws should not or cannot penetrate substrate, attach with plastic strap.

E. Single items of equipment enclosed in a housing or compartment to be tagged on outside of housing.
   1. Several items of equipment mounted in housing to be individually tagged inside the compartment.

3.2 SCHEDULES

A. Electrical Systems:
   1. Trenches with ductbanks, direct-buried conduit, or direct-buried wire and cable.
      a. Tag type: Type F - Underground Warning Tape.
      b. Letter height: 1-1/4 IN minimum.
      c. Location:
         1) Where trench is 12 IN or more below finished grade: In trench 6 IN below finished grade.
         2) Where trench is less than 12 IN below finished grade: In trench 3 IN below finished grade.
      d. Electrical power (e.g., low and medium voltage):
         1) Color: Red with black letters.
         2) Legend:
            a) First line: “CAUTION CAUTION CAUTION”.
            b) Second line: “BURIED ELECTRIC LINE BELOW”.
   2. Panelboards:
      a. Tag type: Type C - Phenolic Name Plates.
      b. Fastener: Screws.
      c. Legend:
         1) Letter height:
            a) First line: 3/8 IN minimum.
            b) Subsequent lines: 3/16 IN minimum.
         2) First line: Equipment name (e.g., "PANELBOARD LPxxx" or "TRANSFORMER Txxx").

3) Second line (panelboards only): System voltage and phase (e.g., “208/120V, 3PH”).
4) Third line:
a) Source of power (e.g., "FED FROM MCCxxx LOCATED IN ROOM xxx").
b) Include the building name or number if the source is in another building.
5) Fourth line: Date installed (e.g., “INSTALLED JULY 20xx”).

3. Conductors in handholes.
a. Tag type: Type A3 - Metal Tape Tags.
b. Fastener: Nylon strap.
c. Tag conductor at both ends.
d. Legend:
1) Letter height: 1/8 IN minimum.
2) Circuit number or wire number as scheduled on the Drawings.

4. Grounding conductors associated with grounding electrode system in accordance with the following:
a. Tag type: Type D - Self-Adhesive Tape Tags.
b. Fastener: Self.
c. Legend:
1) Letter height: 1/8 IN minimum.
2) Function of conductor (e.g., "MAIN BONDING JUMPER", "TO GROUND RING", "TO MAIN WATER PIPE").

5. Flash protection for panelboards and industrial control panels:
a. Tag type: Type D - Self-Adhesive Tape Signs.
b. Fastener: Self.
c. Legend: Per NFPA 70.

3.3 HAZARD AND SAFETY SIGNS

A. Provide 10 Hazard and Safety Signs:
1. Type B2.
2. Inscription as directed by Owner.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 10 14 23
SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Site signage.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. Iowa Department of Transportation (IDOT), Standard Specification for Highway and Bridge Construction.
   2. U.S. Department of Transportation:
      a. Manual of Uniform Traffic Control Devices (MUTCD).

1.3 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00.
   2. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
      c. Color charts for Engineer's color selection.
   3. Site signage showing finish, size, letter style, text, border, and installation detail.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Site Signage:
   1. Conform to IDOT Section 2524.02, Type A Signs.
   2. Posts as noted on attachment following this Section; alternate posts subject to Engineer’s approval.

2.2 FABRICATION

A. Site Signage:
   1. Sign panels conforming to IDOT, Section 4186.02B, galvanized steel; thickness based on longest side.
   2. Optionally provide aluminum signs conforming to IDOT Section 4186.02A.
   3. Reflective sheeting: Conforming to IDOT Section 4186.03, Type 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Site Signage:
   1. As noted on Drawings.
   2. Conforming with IDOT and MUTCD.

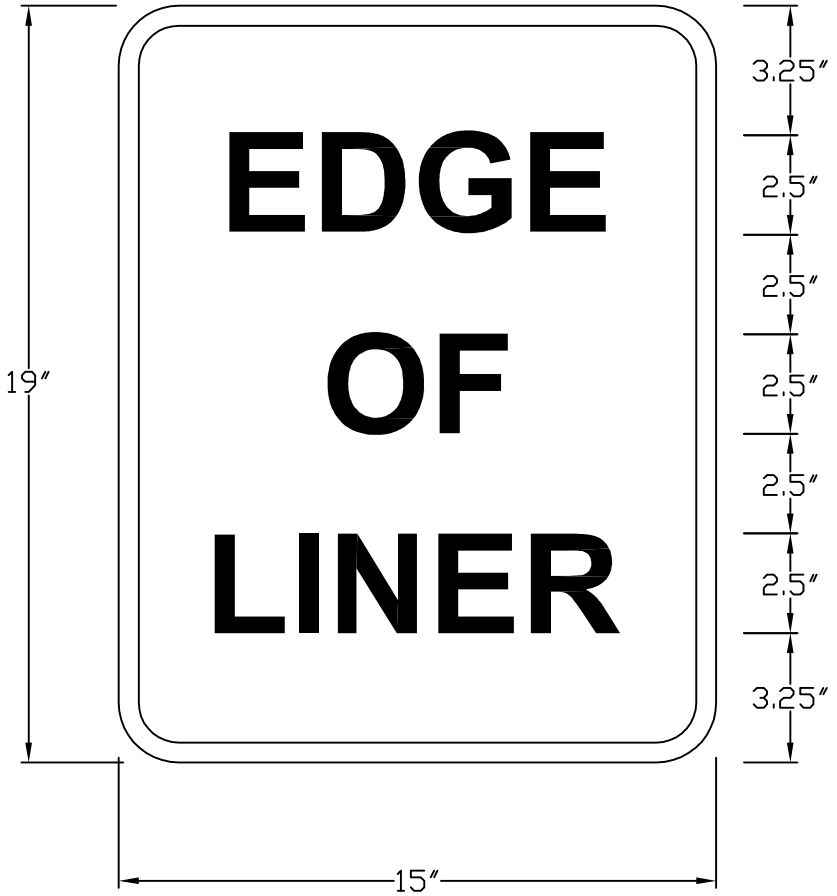
3. Final location established in field with Owner.

3.2 SCHEDULE

A. Site Signage:
   1. As shown on attachment following this Section or as an alternate, match existing signs.

B. Lettering and Colors:
   1. As noted on attachment following this Section.
   2. Per MUTCD.

END OF SECTION



Corner radius: 1.5”
Border width: 0.5”
Color: White border and lettering on green background
Text Font: E MOD
Sign post: 8’–0” ”U” post 3–1/8”x1–17/32” galvanized steel

THIS PAGE INTENTIONALLY LEFT BLANK

DIVISION 31

EARTHWORK

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 31 10 00
SITE CLEARING AND PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Site clearing, protection of wells and piezometers, protection of standpipes, protection of utilities, stripping of soils.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 23 00 - Earthwork.
   4. Section 32 91 13 – Topsoiling and Finished Grade.
   5. Section 31 25 00 – Soil Erosion and Sediment Control.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect existing wells and piezometers, ground water risers, standpipes, landfill gas wells, terraces, pump stations, leachate manholes, utility services and control panels, roadways and culverts, truck wash, designated structures, trees, and vegetation to remain against damage.
   1. Provide temporary protection as required.
   2. Do not smother trees by stockpiling construction materials or excavated materials within the drip line.
   3. Avoid foot traffic or vehicular traffic or parking of vehicles within the drip line.

B. Owner will repair or replace wells and piezometers damaged by construction operations.
   1. Owner will deduct cost of repair or replacement from Contractor's payments.

C. Contractor will pay utility company or others as required for any repairs to damaged utilities.

D. Contractor will repair or replace all other existing features damaged by construction.
   1. Repair to be performed by qualified personnel.
   2. Restore to pre-existing (new) condition.

3.2 DISPOSAL

A. Soils Removal:
   1. Strip topsoil, Unsuitable Soils, and other soils to depths encountered, if applicable.
      a. Remove trees, shrubs and heavy growths of grass before stripping.
      b. All trees must be removed prior to March 31 to avoid disturbance during migratory bird season. Contractor shall identify trees planned for removal and coordinate with Owner and Engineer for approval.
      c. Stop stripping sufficient distance from trees to remain, prevent damage to main root system.
      d. Do not strip outside the designated limits of construction.
      e. Separate from underlying subsoil or objectionable material.

2. Stockpile soils where directed by Owner or as shown on Contract Drawings.
    a. Construct storage piles to freely drain surface water.

B. Clearing and Grubbing:
1. Clear from within limits of construction all timber, brush, rubbish, organic matter, rock, cobbles, boulders and Unsuitable Soils, not marked to remain.
    a. Include shrubs, downed timber, rotten wood, heavy growths of grass and weeds, vines, structures and debris.
2. Grub (remove) from within limits of construction all timber, stumps, roots, root mats, logs and debris, if encountered.
3. Note special precautions when cleaning and excavating in areas of existing capping and liner systems.

C. Topsoil Removal, if necessary:
1. Strip topsoil to a minimum of 12 IN within limits of grading and fill area not otherwise disturbed by earthwork associated with site surcharge.
    a. Stop topsoil stripping sufficient distance from such trees to prevent damage to main root system.
    b. Separate from underlying subsoil or objectionable material.
    c. Topsoil from designated wetlands shall be separately stockpiled and shall not be used in general construction without Engineer's approval.
2. Do not strip topsoil in areas where no change in grade occurs.
3. Stockpile topsoil where it will not obstruct drainage patterns.
    a. Construct storage piles to freely drain surface water.
    b. Seed or cover storage piles to prevent erosion.
4. Remove initial 12 IN of soil within the limits of fill and grading areas.
    a. Top 12 IN shall be managed as topsoil, unless otherwise directed by Owner.
5. When directed by Owner's Construction Quality Assurance Consultant remove remaining topsoil (below top 12 IN) to depths encountered.
    a. Replace topsoil removed below top 12 IN with Structural Fill, unless otherwise directed by Engineer.
        1) Additional topsoil requiring removal and replacement will be paid for at the same unit cost as Removal and Replacement of Unsuitable Soils.
6. Place topsoil in temporary on-site stockpiles or at stockpile locations shown on Drawings.
7. Do not strip topsoil outside of areas designated on the Drawings.

D. Subgrade Preparation:
1. Following removal of topsoil, grade area below foundations or structural fills to the specified lines and grades as shown on the Drawings.
    a. Excess soils from grading shall be stockpiled on-site and may be used for structural fill if adequate in characteristics.
        1) Determination of adequacy shall be at the sole discretion of Owner's Quality Assurance Consultant.
    b. Finished surface shall be compacted to specifications required for structural fill.
2. Prior to placement of subsequent lifts of soils (e.g., granular or cohesive and Structural Fill soils) proof roll area within limits of fill soils to help determine areas of Unsuitable Soils.
    a. Proof rolling may be accomplished by loaded dump truck, or vehicles of similar weight and configuration.
    b. Contractor's Testing Agency shall observe proof rolling and define the acceptability of subgrade as well defining the extent of Unsuitable Soils removal and replacement or need to place Stabilization Geogrid.
        1) Payment for Removal and Replacement of Unsuitable Soils will be at the unit price defined in the Contract.
            a) Contractor shall survey excavation for purposes of measurement and payment.

2) Owner may also determine that rather than remove and replace Unsuitable soils that a Stabilization Geogrid may be used.
    a) Payment for Stabilization Geogrid will be at the price agreed upon between Owner and Contractor by Change Proposal Request.
    b) Unless otherwise directed, Unsuitable Soils will be removed and replaced, to depth encountered, with Structural Fill per Specification Section 31 23 00.
    c) Unsuitable Soils may be used in designated stockpile locations or is suitable in characteristics (See Section 31 23 00) may be re-worked for use as Structural Fill.
3) Temporary stockpile locations shall be free draining and shall not impede on-site drainage or result in sediment releases from the site.
4) Do not intermix Unsuitable Soils with topsoil in the stockpile locations.
    a) Provide bottom surface following topsoil removal or removal and replacement of Unsuitable Soils that ensures above grade areas are naturally draining or provide pumping for areas not naturally draining.
5) Positive drainage must be maintained for construction in areas below existing grade.

3. For areas not receiving additional fill soils recompact the removal area, and cover with 3 IN of compost to incorporate into amended topsoil per Specification Section 32 91 13 and Section 32 92 00 to achieve the designated grades shown on the Drawings.

E. Disposal of Waste Materials:
1. Do not burn combustible materials on site.
2. Remove all waste materials and properly dispose of on-site, as directed by the Owner.
    a. No fee will be assessed at the landfill for solid waste and properly sized vegetative waste originating on the site and disposed of at the landfill or compost area.
3. Do not bury organic matter on site.

3.3 ACCEPTANCE

A. Upon completion of site clearing, obtain Engineer's acceptance of the extent of clearing and depth of stripping.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 31 23 00
EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Earthwork requirements for soil materials.
   2. Placement of fills for recompacted clay liner, drainage layer and coarse aggregate for leachate collection trenches, culverts, berms, drainage structures, aggregate surfacing, structural fill, backfill, excavation and trenching, and terracing.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 02 65 00 - Soils Testing.
   4. Section 31 10 00 – Site Clearing.
   5. Section 31 23 33 - Trenching, Backfilling, and Compacting.
   6. Section 31 25 00 – Soil Erosion and Sediment Control.
   7. Section 33 34 61 - High-Density Polyethylene (HDPE) Geomembrane Liner.
   8. Section 31 32 19 - Geotextiles.
   9. Section 01 71 24 - Geomembrane Electrostatic Leak Location Survey.
   10. Section 32 91 13 – Topsoiling and Finished Grade.
   11. Section 32 92 00 - Seeding and Landscaping.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. C33, Standard Specification for Concrete Aggregates.
      b. D422, Standard Test Method for Particle-Size Analysis of Soils.
      c. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 FT-lbf/ft3).
      d. D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 FT-lbf/ft3(2,700 kN-m/m3)).
      e. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
      f. D2434, Standard Test Method for Permeability of Granular Soils (Constant Head).
      g. D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System.
      h. D4318, Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
      i. D5084, Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
   2. American Association of State Highway and Transportation Officials (AASHTO):
      a. T104, Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
   3. Environmental Protection Agency (USEPA):
      a. Technical Guidance Document - Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182, September 1993.
   4. Iowa Department of Transportation (IDOT):
      a. Standard Specifications for Highway and Bridge Construction.

B. Quality Control and Assurance:
   1. The Contractor's Testing Agency will conduct soils testing to support construction quality assurance program and to provide documentation of such to the Engineer to facilitate appropriate regulatory agency approvals.
      a. The Owner or Engineer's Representative may conduct additional independent soils testing if it is suspected that proper methods and reporting are not being met by the Contractor's Testing Agency.
      b. Facilitate and provide opportunities for Owner/Engineer's Representative to be present for all on-site testing conducted by Contractor's Testing Agency.
   2. Unless specifically superseded by these Contract Documents or approved plans submitted by the Contractor, recompacted clay liner and drainage layer shall be prepared, placed, compacted, processed, tested and protected as described in EPA/600/R-93/182.
      a. This includes, but is not necessarily limited to:
         1) Material selection and prequalification.
         2) Placement, remolding and compaction.
         3) Protection from desiccation, freezing temperatures and excess surface water.
         4) Construction of test pads and test strips.
         5) Repair of holes.
   3. The Contractor's Testing Agency shall perform soils testing prior to test pad construction as follows and as further described in Section 02 65 00:
      a. Recompacted clay liner:
         1) Prequalification Laboratory Testing:
            a) Atterberg Limits/Plasticity.
            b) Visual Classification.
            c) Percent Fines.
            d) Moisture Content.
            e) Moisture/Density Relationship.
            f) Hydraulic Conductivity.
   4. The Contractor's Testing Agency shall perform soils compliance testing during construction as follows and as further described in Section 02 65 00:
      a. Recompacted clay liner:
         1) Laboratory Testing:
            a) Moisture/Density Compaction Curves.
            b) Water Content.
            c) Atterberg Limits/Plasticity.
            d) Percentage Fines.
            e) Percentage Gravel.
            f) Maximum Clod or Particle size, if deviation from specification is disputed.
            g) Hydraulic Conductivity.
         2) Field testing for Quality Assurance:
            a) Field density compaction and moisture tests on completed portions.
            b) Other quality assurance tests as specified within the CQA Plan within Appendix A.
            c) Contractor to pay for failing moisture/density tests.
      b. Drainage Layer and Coarse Aggregate:
         1) Section 02 65 00.
      c. Backfill for Trenches:
         1) Field compaction tests on finished structural fill.
            a) Test frequency at 1 test per 100 linear feet of anchor trench
      d. Structural Fills.
         1) Compaction Curves.
         2) Field Compaction and Moisture Tests on Finished Products.
         3) Quality assurance tests as Engineer deems appropriate.

1.3 DEFINITIONS

A. Borrow Material:
   1. All Borrow Material for purposes of this Contract is classified as Unclassified.
   2. Materials excavated from the project site suitable for processing to either recompacted clay liner, structural fill or backfill.
      a. Historically, materials such as rocks, cobbles and boulders have had to be removed by methods including hand picking as part of the processing for suitability.

B. Hydraulic Conductivity: The rate of discharge of water under laminar flow conditions through a unit cross-sectional area of a porous medium under a unit hydraulic gradient and standard temperature conditions.

C. Materials:
   1. Clean Soil:
      a. Any non-granular soil free of organics with no rocks or lumps greater than 1 IN.
   2. Base Grade:
      a. The bottom elevation or bottom grade of the recompacted clay liner.
   3. Unsuitable Soils:
      a. Excessively wet, soft, loose or high in organic content soils, or soils containing solid waste or excessive amounts of granular soil materials located below Base Grade, or boulders or rocks found below Base Grade and projecting above Base Grade or as otherwise directed by Engineer that are not considered as acceptable subgrade for the support of the recompacted clay liner or other structures.
   4. Solid Waste: As defined by Iowa Administrative Code, Part 567, Title VIII.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00.
   2. Product technical data including:
      a. Acknowledgement that materials submitted meet requirements of these Specifications and of standards referenced.
   3. Test reports:
      a. Soils inspection, prequalification testing, and production compliance testing results.
      b. Soils compaction and moisture testing results completed by Contractor's Testing Agency.
      c. Proof roll inspection reports completed by Contractor's Testing Agency.
   4. Proposed earthwork moving, placement, processing and compaction equipment, sequence of filling, and procedure for review before starting construction.
   5. Proposed placement methods for:
      a. Recompacted clay liner.
      b. Drainage layer and coarse aggregate over geosynthetics.
      c. Structural fill and backfill.

B. Samples:
   1. Submit samples, source of and test results on soils for drainage layer and coarse aggregate and soils proposed for use as recompacted clay liner.
   2. Recompacted clay liner and other fill materials proposed for use.

C. Miscellaneous:
   1. Results of all prequalification and compliance testing required by Section 02 65 00.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials to be used include the following classifications:

1. Recompacted clay liner: Clayey soil.
2. Drainage layer: Granular soil.
3. Coarse aggregate: Granular soil.
4. Structural fill and backfill: Any clean, non-granular soil.
5. Bentonite: Processed sodium montmorillonite clay.

B. The properties of the soil materials to be used are defined below:
   1. Recompacted clay liner:
      a. Material:
         1) Clay.
      b. Material classification:
         1) CH or CL, ASTM D2487.
      c. Source:
         1) Glacial till on site.
      d. Requirements:
         1) Plastic index (ASTM D4318):
            a) Greater than 10% and less than 35%.
         2) Sieve analysis (ASTM D422):
            a) Minimum of 30% by weight passing a #200 sieve (fines), maximum of 30% by weight retained on #4 sieve (gravel), and maximum particle size of 1 IN.
         3) Free from roots, organic matter, trash, and frozen material.
      e. Required performance:
         1) Hydraulic Conductivity less than $1x10^{-7}$cm/sec (ASTM D5084).
            a) This shall be demonstrated by Contractor's lab testing.
            b) A test pad shall be constructed for purposes of demonstrating level of compaction and moisture content required to achieve specified hydraulic conductivity in coordination with Engineer. See CQA Plan.
            c) Tests/demonstrations shall be performed for each soil type used in recompacted clay liner construction.
   2. Drainage layer:
      a. Material:
         1) Granular.
         2) No calcareous materials such as limestone or dolomite in drainage layer.
      b. Material classification:
         1) IDOT, Porous Backfill.
      c. Possible sources:
         1) Off-site quarry.
      d. Prequalification requirements:
         1) Soundness (AASHTO T104):
            a) Soundness loss not more than 12% by weight at the end of five cycles using sodium sulfate solution.
         2) Gradation in accordance with IDOT Standard Specifications for Highway and Bridge Construction, Section 4109 Aggregate Gradation Table, Gradation No. 29.
         3) Hydraulic conductivity greater than 0.2 CM/sec under loose conditions (ASTM D2434).
   3. Coarse aggregate:
      a. Material:
         1) Granular.
         2) Natural gravels.
         3) No calcareous materials such as limestone or dolomite in leachate and gas collection trenches.
      b. Material classification:
         1) Gradation in accordance with:
            a) 100% passing 3 inch sieve.
            b) 80% to 100% passing 1.25 inch sieve.
            c) 0% to 5% passing 0.5 inch sieve.

d) 1.5% maximum passing #200 sieve.

c. Possible sources:
1) Off-site quarry.

4. Structural fill and backfill:
a. Non-granular soil meeting specified requirements for clean soil.
b. Do not use material excavated as unsuitable soil material.

5. Sodium bentonite shall consist of a mixture of high-swelling sodium montmorillonite clay and be in accordance with the following:
a. Colloid content in excess of 70%.
b. 100% passing #10 sieve.
c. 20% maximum passing #200 sieve.

6. Perimeter Access Road and Phase 2 Access Road:
a. Conform to Iowa DOT Standard Specification Section 4109 for Aggregate Gradations.
b. Subgrade consisting of structural fill and aggregate base per the Drawings. Subgrade to pass proof roll prior to placement of base coarse. See Specification 02 65 00.
1) Subgrade preparation should extend a minimum of 2 FT laterally beyond the edges of the surfacing.
2) The top of subgrade shall be rolled smooth with a drum or similar equipment to provide a smooth surface with allows intimate contact between the subgrade and geotextile.
c. Base Course:
1) IDOT Gradation No. 13 in conformance with Section 4122 Crushed Stone Base Material requirements in the Iowa DOT Standard Specifications.
2) Thickness: 6 IN.
d. Surface Course:
1) IDOT Gradation No. 11 in conformance with Section 4119/4120 requirements in the Iowa DOT Standard Specifications.
2) Thickness: 3 IN.

2.2 TOLERANCES

A. Finish grade elevation tolerances as follows:
1. Base Grade for recompacted clay liner: Plus 0.0 FT.
2. Subgrade for HDPE geomembrane:
a. Bottom of Cell (top of clay): Minus 0.0/plus 0.1 FT.
3. Top of drainage layer: Minus 0.0/plus 0.1 FT.
4. Top of structural fills outside of cell: Minus 0.2/plus 0.2 FT.

B. See Section 33 34 61 for surface uniformity requirements.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect existing surface and subsurface features on site and adjacent to site as follows:
1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing items indicated to remain in place.
2. Protect and maintain benchmarks, monuments or other established reference points and property corners.
a. If disturbed or destroyed, replace to full satisfaction of Owner and controlling agency at no additional cost to Owner.
3. Verify location of utilities.
a. Omission or inclusion of utility items does not constitute non-existence or definite location.
b. Secure and examine local utility records for location data.

1) Take necessary precautions to protect existing utilities from damage due to any construction activity.
2) Repair damages to utility items at Contractor's own expense.
3) In case of damage, notify Owner and utility company at once so required protective measures may be taken.

4. Maintain free of damage existing culverts, roadways, fence, structures, and pavement, not indicated to be removed.
   a. Any item known or unknown or not properly located that is inadvertently damaged shall be repaired to original condition.
   b. All repairs to be made and paid for by Contractor.
5. Provide full access to public and private premises, the landfill, maintenance buildings, leachate riser pipes, landfill gas wells and appurtenances, leachate treatment facilities, road crossings, monitoring wells and piezometers and other points as designated by Owner to prevent serious interruption of travel.
6. Maintain stockpiles and excavations in such a manner to prevent inconvenience or damage to structures on the Owner's property or on adjoining property.
7. Avoid surcharge or excavation procedures that can result in heaving, caving, or slides.
8. Shoring:
   a. Shore, sheet pile, slope, or brace excavations as required to prevent them from collapsing.
   b. Remove shoring as backfilling progresses but only when banks are stable and safe from caving or collapse.
9. Drainage:
   a. Control grading around structures so that ground is pitched to prevent water from running into excavated areas or damaging structures.
   b. Maintain excavations free of water.
   c. Provide pumping required to keep excavated spaces clear of water during construction.
   d. Should any water be encountered in the excavation undertake required dewatering.
   e. Provide free discharge of water by trenches, pumps, wells, or other means as necessary and drain to point of discharge that will not damage existing or new construction or interfere with construction operations.
10. Frost protection:
    a. Do not place fill material on frozen ground.
    b. When freezing temperatures may be expected, do not excavate to full depth indicated, unless fill material can be placed immediately after excavation has been completed and approved.
    c. Protect excavation from frost if placing of fill is delayed.

3.2 WASTE, STOCKPILES AND EXCESS MATERIALS

A. Salvageable Items:
   1. Carefully remove items to be salvaged, and store on Owner's premises at Owner-designated locations unless otherwise directed.
   2. See Section 01 73 29 and Section 31 10 00.

B. If sand, cobbles and rocks or silt lenses are encountered during excavations in the Glacial Till, these materials should be removed, stockpiled at the location designated by Owner.
   1. Do not use in the construction of the recompacted clay liner.

C. Haul excess soil, Unsuitable Soils and granular materials from excavation and stockpile at locations designated on the Drawings.
   1. Do not mix soil types unless approved by Engineer.
   2. Use Owner earthmoving equipment haul roads rather than landfill access roads where possible.

D. Remove solid waste encountered in grading and as a result of weather events and dispose of at active fill face of landfill.
   1. Weather related solid waste will not be paid for as Unsuitable Soils.

3.3 SITE EXCAVATION AND GRADING

A. The work includes all operations in connection with excavation, borrow, construction of fills and embankments, rough and fine grading, and stockpiling of excess materials in connection with the preparation of the site for construction of the proposed facilities.

B. Provide dewatering system where necessary to successfully complete excavation, trenching, compaction, and other construction requirements.
   1. Pump accumulated storm water, leachate, and ground water as required to prevent damage to ground water collection trenches, leachate collection trenches and sumps, liner and other construction and to allow construction access.

C. Protection of Finish Grade:
   1. During construction, shape and drain embankment and excavations.
   2. Maintain ditches, terraces, berms, and drains to provide drainage at all times.
   3. Protect graded areas against action of elements prior to completion and acceptance.
   4. Reestablish grade where erosion or sedimentation occurs.

D. The Contractor has the responsibility to maintain all soil layers intact in all respects including:
   1. Thickness, moisture content, density, free of waste, free of rill erosion, and free of weather related damage.
      a. Do not allow liner system drainage layer or coarse aggregate to be contaminated with silt or clay soils or solid waste.
      b. Remove any impacted soil.

E. Excavation and Grading:
   1. Perform as required by the Contract Documents.
      a. Drawings may indicate both existing grade, intermediate grades, and finished grade required for construction of Project.
         1) Survey and locate all units, slopes, grades, structures, and piping, and establish their elevations.
         2) Perform other surveying and layout work required for Project excavation.
   2. Locate the edge of the existing recompacted clay liner, HDPE, geotextile, and drainage layer prior to any other site excavation or construction of fills.
      a. Cell D: Locate the eastern edge of Cell B and the southern edge of Cell C.
   3. Remove and replace unsuitable soils with recompacted clay liner soil in liner area when over excavation below Base Grade is required.
   4. See compaction requirements in this Section.
   5. Do not excavate below indicated Base Grades for the liner system, unless required to remove Unsuitable Soils or specifically required to construct structures and other design features.

F. Excavation for Groundwater Collection System:
   1. Excavate trenches by open cut method to grade shown on Drawings and necessary to accommodate work.
   2. Open no more than 300 LF of trench at one time, unless approved by Engineer.
   3. Any trench or portion of trench, which is opened and remains idle for 5 calendar days, or longer, as determined by the Owner or Engineer, may be directed to be immediately refilled, without completion of work, at no additional cost to Owner.
      a. Said trench may not be reopened until Owner is satisfied that work associated with trench will be prosecuted with dispatch.
   4. Do not excavate below indicated grades unless required to remove unsuitable soil.
   5. Avoid overloading or surcharge of sufficient distance back from edge of excavation to prevent slides or caving.
      a. Maintain and trim excavated materials at all times.
   6. Cut trench walls vertically from bottom of trench to a minimum of 1 FT above top of pipe.
   7. Keep trenches free of water. Liquids to be pumped to the leachate pond.

8. Over-Excavation:
    a. Backfill with structural fill and compact to 95% of maximum dry density per ASTM D698.
9. Subgrade Stabilization:
    a. Stabilize the subgrade when directed by the Engineer.
    b. Observe the following requirements when unstable trench bottom materials are encountered.
        1) Notify Engineer when unstable materials are encountered.
            a) Define by Drawing coordinate locations and limits.
10. Include cost of dewatering and groundwater pumping in original proposal.
    a. Groundwater pumping and removal shall be Contractor's responsibility.

G. Backfill of Groundwater Collection System:
1. Backfill trench with Coarse Aggregate material after lining trench with geotextile as specified herein.
2. Hand or pneumatic tamp backfill under and around pipe, where applicable.
3. Brace, shore, or lay back trenches as soil conditions and OSHA requirements dictate.
4. Backfill shall be placed in lifts not exceeding 8 IN loose thickness and compacted to specified density.
5. Exercise care in backfilling and compaction operations to avoid displacing pipe joints either horizontally or vertically and to avoid breaking pipe.
6. Do not water flush for consolidation.

H. Borrow for Recompacted Clay Liner:
1. Not all glacial till material on-site should be considered suitable for use in the recompacted clay liner.
    a. Do not mix or blend sandy soils or soil unsuitable for recompacted clay liner with soil suitable for recompacted clay liner.
2. No material for the recompacted clay liner shall be placed until the Engineer receives prequalification tests confirming their acceptability, establishment of acceptable zone for moisture and density, and until Engineer receives the moisture density compaction test results, unless alternately approved.
3. Provide necessary amount of approved soil for recompacted clay liner and compact to density and moisture required to meet hydraulic conductivity requirements and meeting the minimum values indicated in this Section.
4. Borrow all material from Owner's site unless otherwise approved.
    a. On-site materials shall be tested by Owner and shall meet the prequalification requirements of the specifications for each layer prior to placement.
5. Borrow soils used in the recompacted clay liner shall be processed and blended prior to moisture conditioning and compaction.
    a. These soils shall be processed and blended to provide a homogeneous material with 95% passing the 1 IN sieve size at the time of compaction.
    b. The Contractor shall use a stationary pugmill, a stationary shredder-mixer, a mobile traveling-plant stabilizer/reclaimer such as the Caterpillar RR-250 or CMI RS-500 for the processing and blending operations.
    c. Equipment shall be provided with suitable capacity to ensure required production rates are satisfied.
    d. Soils processed in-place with a traveling-plant operation shall be processed for the full loose lift thickness to be compacted.
    e. Manually or mechanically remove rocks and stones exceeding maximum particle size.

I. Construct Recompacted Clay Liner:
1. Construct fills at location and to lines and grade indicated.
    a. Completed fill shall correspond to shape of cross section or contour indicated.

2. Moisture control:
    a. Recompacted clay liner:
        1) Maintained in a range established by acceptable zone but in no instances outside the range for optimum moisture to less than or equal to 5% above optimum moisture as defined by ASTM D698.
            a) Engineer will develop an acceptable zone (density and moisture) upon receipt of the Contractor's prequalification testing and submittals to achieve the minimum requirements for hydraulic conductivity of the recompacted clay liner.
3. Processed soils which are installed and which do not meet the compaction and moisture content specification requirements must be excavated and removed.
    a. They may be reprocessed to meet requirements or used in other areas of the work, as appropriate.
4. Prior to the placement of each lift of the recompacted clay liner, the subgrade and each subsequent lift shall be scarified to a depth of 1.5 IN to promote bonding. Holes in each subsequent lift shall be filled by Contractor with bentonite, field hydrated, per this Specification Section and Section 02 65 00.
5. Take care not to disturb the top of individual layers of the recompacted clay liner beyond the scarification depth when installing subsequent layers.
    a. The first lift of a new layer may be constructed by placing a stockpile of material at the starting point and then pushing the material out onto the previous layer.
    b. Any damage to previously constructed layers shall be repaired before the placement of successive layers.
6. If subsidence or damage occurs, repair to the lines and grades shown on the Drawings or tolerance listed above.
7. If a failure as defined in moisture and density requirements is detected, after placement of any part of the recompacted clay liner, this material, in the area of the failure, shall be over excavated, the failure repaired and the full depth of the layer replaced in lifts and compacted as specified.
8. The final lift of the recompacted clay liner shall be rolled smooth with a drum or similar equipment to provide a smooth surface which allows intimate contact between the HDPE geomembrane and the recompacted clay liner.
    a. The rolled surface shall be free of sharp edges that may damage the geomembrane.
    b. The resulting surface of compacted soil liner shall be protected from desiccation and cracking with the use of 6 IN of soil cover, a thin plastic cover, or regularly adding water to maintain proper moisture.
    c. Immediately prior to the placement of the HDPE geomembrane, the means of protection shall be completely removed and the recompacted clay liner rolled smooth, as necessary.
9. The finished subgrade shall be walked and visually inspected by the Contractor, HDPE geomembrane installer, and Owner/Engineer's Representative prior to HDPE geomembrane deployment.
    a. Any stones, rocks, or surface irregularities shall be hand excavated and backfilled with 2 IN thick layers of a moist bentonite-soil mixture.
10. No surveying grade stakes or other penetrations shall be made in the recompacted clay liner.
    a. If such penetrations occur, entire area is subject to removal and replacement at no additional cost to the Owner.
    b. Alternate methods of repair subject to approval of Engineer.

J. Construct Drainage Layer for Liner Construction:
1. Drainage layer shall be placed under the direct observation of the Contractor and to the applicable limits based on the awarded Work.
    a. Utilize care to avoid damage to the HDPE geomembrane liner and geotextiles.
    b. Any damaged HDPE geomembrane and geotextiles shall be replaced in accordance with Manufacturer's recommendations.

c. No traffic will be permitted directly on the unprotected HDPE geomembrane liners or geotextiles.

2. The drainage material shall each be placed in a single loose lift.
   a. The initial material placement shall be by tracked backhoe, excavator, or similar equipment operating on a minimum of 3 FT working layer of material.
      1) Maximum tire pressure or equivalent surface pressure on top of 3 FT layer shall be 65 PSI or less.
      2) Limit movement to that approved in test pad construction.
   b. Do not allow the materials to free fall onto the geomembranes and geotextiles.
   c. Strike off at final grade shall be made by back dragging the backhoe or excavator bucket or with a low ground pressure (5.2 PSI maximum) dozer.
   d. Methods of spreading shall not cause damage, bubbling, ripples, folds, tension stresses or stress concentrations.
3. Granular material used in the drainage layer (and as coarse aggregate) shall contain no free moisture.
4. Fill around pipes shall be placed so that deflection of the pipe or load damage does not occur.
5. No compaction of the drainage layer is allowed.
6. The drainage layer shall be protected from fine soil contamination including slope wash down, wind-blown silts and clays, and stockpiling and rehandling.
   a. Replace the drainage layer at Contractor expense should contamination occur.
7. Leachate collection pipes, see Section 40 05 00.
8. Work shall be conducted in a manner that will not damage the geosynthetic liner system components and will produce a stable soil layer.
9. Construct a test section to demonstrate placement methods for the drainage layer cover soils.

K. Structural Fill and Backfill:
   1. Structural backfill shall be placed and compacted in the excavation and below the recompacted clay liner using the same requirements for compaction as the recompacted clay liner, except for lift thickness as specified in this Section.
   2. Maintained in a range from 3% below optimum moisture to 5% above optimum moisture as defined by ASTM D698. Density and moisture testing shall be done at a frequency of one test per 200 linear feet horizontally and one test per 12 inches vertically for structural fill within access roads and the tipping pad. Density and moisture testing shall be conducted at a frequency of one test per 1,000 cubic yards all other locations of structural fill. Coordinate with onsite Owner representative/RPR.

3.4 FIELD QUALITY CONTROL

A. Owner/Engineer will establish the Acceptable Zone (range) for soil moisture and density based on Contractor's prequalification testing and test pad results to achieve the hydraulic conductivity requirements for the compacted clay liner and based on the test pad results.
   1. Testing will be conducted on the test pads constructed by the Contractor.

B. Moisture density relations are to be established by the Contractor's Testing Agency for all materials to be compacted for Cell D development.

C. Moisture-density relationships (compaction curves), per ASTM D698, are to be established by the Owner's soil testing program for all cohesive (clayey) materials to be compacted.
   1. These values will be established and reported to the Contractor prior to the start of excavation and placement.

D. Contractor's Testing Agency will perform in-place moisture-density tests after soils have been placed and compacted.
   1. Contractor to pay for all failing tests as provided for in Section 02 65 00.

2. Assure Owner or Engineer has immediate access for testing of all soils related work.
3. Ensure excavations are safe for testing personnel.

E. Minimum level of testing by Contractor will be as specified in this Specification Section and Section 02 65 00.

F. Any moisture-density test or subgrade inspection test which fails to meet specification requirements (defined as failure) will require corrective action, as necessary.
1. Corrective action on layer shall include complete excavation of failed area, reprocessing, moisture adjustment, refilling and recompaction at no cost to the Owner.
2. Corrective action may also include removal and replacement if material becomes contaminated or fails to meet specifications as a result of Contractor's activities.

3.5 TEST PADS AND TEST SECTIONS

A. The construction of test pad(s) or test section(s) is required in accordance with the CQA Plan to verify that the materials and methods of construction proposed for production will produce a recompacted clay liner as shown on the Drawings with the required in-situ hydraulic conductivity.
1. Lift thickness shall comply with Section 3.6.A.2.
2. The minimum size of the test pad shall be 40 FT x 60 FT in plan area.
3. Actual width of test pad shall be four times the width of compaction equipment.
4. Length of test pad must be adequate for equipment to reach operating speeds.
5. Methods shall be identical to those utilized in actual construction.
6. The Contractor may be required to demonstrate that equipment utilized can achieve proposed production rates for the recompacted clay liner.
7. Test pad may be part of proposed construction and remain in place provided all compaction tests pass specified moisture and density requirements and are maintained.
8. Perform additional test pads for each soil type used for the recompacted clay liner.

B. Construct test sections to demonstrate methods of placement of granular drainage layer (including coarse aggregates) in cell liner areas.
1. Test sections shall demonstrate that personnel, equipment and placement methods will not damage underlying geosynthetic materials.
2. Test section shall utilize identical equipment and methods to those utilized in actual construction.

C. Additional test pads or test sections shall be constructed for each change in material type, equipment, placement method or operator.
1. Engineer may require test sections to demonstrate that any proposed equipment movement patterns will not damage geosynthetic materials.

3.6 MATERIAL PLACEMENT

A. Soil shall be placed in the following required lift thicknesses for the Cell D Construction:
1. Recompacted clay liner: 8 IN maximum loose, 6 IN maximum compacted.
2. Drainage layer and coarse aggregate above HDPE Geomembrane:
   a. Single layer, 12 IN or greater finished thickness.
3. All other areas of compacted soil including structural fill:
   a. 8 IN maximum loose.

B. Place lifts horizontally and compact each layer, when required, to the required thickness, density and moisture content prior to placing additional fill.

C. Compaction densities of the various materials and layers shall comply with the following requirements:
1. Recompacted clay liner: As required to achieve specified hydraulic conductivity, but in no instance less than 95%, ASTM D698 or ASTM D1557.
2. Drainage layer and coarse aggregate above the HDPE Geomembrane: No compaction allowed.

3. Structural fill: 95%, ASTM D698 or ASTM D1557.

D. Compact by sheepsfoot-style soil compactors and pneumatic rollers or by other equipment as required to obtain specified density.
   1. Historic recompacted clay liner construction has required the equivalent of a Caterpillar 825 soil compactor and a Caterpillar 563 vibratory soil compactor to achieve the necessary densities on the recompacted clay liner.

E. Compaction of the recompacted clay liner shall be accomplished with a sheepsfoot roller with fully penetrating feet.
   1. Length of feet should be adequate to penetrate entire lift including scarified portion of lift below.

F. Ensure that each layer of the recompacted clay liner is fully bonded to adjoining layers of the liner.
   1. This may be accomplished with compaction equipment and by disking between adjoining layers, or by other methods demonstrated by a test pad.

3.7 ACCEPTANCE

A. Upon completion of excavation or fill to Base Grade and at each of the components of the roadway aggregate and surface coarse, recompacted clay liner, and drainage layer, the Contractor will perform quality assurance survey, as deemed appropriate, to confirm proper grades and layer thicknesses.
   1. Costs of resurveying for defective thicknesses will be paid by Contractor.

B. Make test holes per Section 02 65 00, where directed to verify proper placement and thickness of the recompacted clay liner and drainage layer.

C. Fill all holes in the recompacted clay liner with either bentonite or approved recompacted clay liner soils and compact in 6 IN lifts to density specified for this material.

END OF SECTION

SECTION 31 23 33
TRENCHING, BACKFILLING, AND COMPACTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavation, trenching, backfilling and compaction for all underground utilities and design elements.
      a. Leachate piping.
      b. Culverts.
      c. Electrical.
      d. All related utility and process appurtenances.

B. Work under this Section may include trenching and grading activities inside and outside of the limits of a Municipal Solid Waste (MSW) Landfill liner system.

C. No classification of type of excavated materials will be made for excavation and trenching.
   1. Excavation includes all soil and solid waste regardless of type, character, composition, moisture, or condition thereof.

D. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 02 65 00 - Soils Testing.
   4. Section 31 23 00 - Earthwork.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 FT-LBF/FT^3 (600 kN-M/M^3)).
      b. D2774, Standard Practice for Underground Installation of Thermoplastic Pressure Piping.

1.3 DEFINITIONS

A. Excavation: All excavation and trenching will be defined as unclassified.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00.
   2. Product technical data including:
      a. Acknowledgement that materials submitted meet requirements of these Specifications and of standards referenced.
      b. Manufacturer's installation instructions and backfill material recommendations.
   3. Submit respective pipe or conduit manufacturer's data regarding methods of installation and general bedding recommendations.
   4. Test reports:
      a. Sieve analysis report for material prequalification for all off-site materials.
   5. Proposed earthwork moving, placement, processing and compaction equipment, sequence of filling, and procedure for review before starting construction.
   6. Proposed placement methods for: Backfill/soil cover over geosynthetics.

1.5 SITE CONDITIONS

A. Provide full access to Owner to prevent serious interruption of travel or landfill operations.

B. Verify location of existing underground utilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill Material:
   1. See Section 31 23 00: As approved by Engineer.
   2. Backfill and non-granular bedding material free of rock cobbles, roots, sod or other organic matter, frozen material, and stones larger than specified in Section 31 23 00.
   3. The Contractor may obtain soil backfill material from the on-site borrow area in areas designated in the Drawings, provided material meets Specifications.

B. Bedding Material:
   1. As approved by Engineer and recommended by pipe manufacturer.
   2. Granular bedding materials.
   3. Gradation and Material Classification: See Section 31 23 00.
   4. Prequalification requirements: See Section 31 23 00 and 02 65 00 on Testing.

PART 3 - EXECUTION

3.1 GENERAL

A. Remove and dispose of Unsuitable Soils as directed by Engineer.
   1. No payment for Unsuitable Soils encountered in trench excavations above the design elevation for bottom and outside the neat excavation lines of the trench.

3.2 PROTECTION

A. See requirements of Section 01 11 20 related to site-specific health and safety plan.

B. Provide full access to public and private premises, the landfill, maintenance buildings, leachate collection system, leachate riser pipes, road crossings, monitoring wells and piezometers, gas wells and components of active gas collection system, and other points as designated by Owner to prevent serious interruption of travel.

C. Protect existing surface and subsurface features on site and adjacent to site as follows:
   1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing items indicated to remain in place.
   2. Protect and maintain benchmarks, monuments or other established reference points and property corners.
      a. If disturbed or destroyed, replace to full satisfaction of Owner and controlling agency at no additional cost to Owner.
   3. Verify location of utilities. Omission or inclusion of utility items does not constitute non-existence or definite location.
      a. Secure and examine local utility records for location data.
      b. Take necessary precautions to protect existing utilities from damage due to any construction activity.
      c. Repair damage to utility items at Contractor's own expense.
      d. In case of damage, notify Owner and utility company at once so required protective measures may be taken.
   4. Maintain free of damage existing vegetation, culverts, roadways, fence, structures, and pavement, not indicated to be removed.
      a. Any item known or unknown or not properly located that is inadvertently damaged shall be repaired to original condition.

b. All repairs to be made and paid for by Contractor.

5. Maintain stockpiles and excavations in such a manner to prevent inconvenience or damage to structures on Owner's property or on adjoining property.
6. Avoid surcharge or excavation procedures that can result in heaving, caving, or slides.

3.3 EXCAVATION

A. Unclassified Excavation:
1. Remove solid waste, rock excavation, clay, silt, gravel, hard pan, loose shale, and loose stone as directed by Engineer.

B. Groundwater Dewatering:
1. Where groundwater is, or is expected to be, encountered during excavation, install a dewatering system to prevent softening and disturbance of subgrade to allow subgrade stabilization, pipe, bedding, and backfill material to be placed in the dry, and to maintain a stable trench wall of sideslope.
2. Groundwater shall be drawn down and maintained at least below the bottom of any trench or excavation prior to excavation.
3. Keep dewatering system in operation until dead load of pipe, structure, and backfill exceeds possible buoyant uplift force on pipe or structure.
4. Dispose of groundwater to an area that will not interfere with construction operations or damage existing construction.
5. Shut off dewatering system at such a rate to prevent a quick upsurge of water that might weaken the subgrade.
6. Cost of groundwater dewatering shall be included in Contractor’s price for lump sum items.

C. Temporary Leachate Management
1. Where leachate is, or is expected to be, encountered during excavation, install a dewatering system to prevent leachate from leaving the solid waste boundary.
2. Leachate shall be drawn down and maintained at least below the bottom of any trench or excavation prior to excavation.
3. Disposed of leachate in the leachate lagoon as coordinated with the Owner.
4. Cost of temporary leachate management shall be included in Contractor’s price for lump sum items.

D. Trench Excavation:
1. Excavate trenches by open cut method to minimum depth shown on Drawings and (based on pre-construction survey) as necessary to accommodate work.
   a. Trench width as shown on details or as recommended by pipe manufacturer.
2. Avoid overloading or surcharge a sufficient distance back from edge of excavation to prevent slides or caving.
3. Excavate as shown on the Drawings.
   a. Support existing utility lines where proposed work crosses at a lower elevation.
      1) Stabilize excavation to prevent undermining of existing utility.
4. Coordinate installation of piping and backfill to leave no more than 300 LF of open trench at any one time.
   a. Any trench or portion of trench, which is opened and remains idle for 5 calendar days, or longer may be directed to be immediately refilled, without completion of work, at no additional cost to Owner.
      1) Said trench may not be reopened until Owner is satisfied that work associated with trench will be prosecuted with dispatch.

E. Excavation for Appurtenances:
1. 12 IN (minimum) clear distance between outer surface and embankment, unless otherwise noted on Drawings.

F. Unauthorized Excavation:
1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or trench width dimensions without specific instruction from the Engineer.

2. Backfill and compact unauthorized excavations as directed by the Engineer.

G. Shoring, Bracing and Stability of Excavations:
   1. Shore and brace excavations where slope cutbacks exceed criteria in accordance with 29 CFR 1926.
   2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.
   3. Remove shoring and bracing as excavation progresses.

3.4 PREPARATION OF FOUNDATION FOR PIPE LAYING

A. Subgrade Stabilization:
   1. Stabilize the subgrade when directed by the Engineer.
   2. Observe the following requirements when unstable trench bottom materials are encountered.
      a. Notify Engineer when unstable materials are encountered.
         1) Define by drawing station locations and limits.
         2) Excavation and replacement of unstable materials shall be paid for under Bid Item for Remove and Replace Unsuitable Soils.
      b. Remove unstable trench bottom caused by Contractor failure to dewater, precipitation, or Contractor operations.
         1) Replace with structural fill with no additional compensation.

B. Over-Excavation:
   1. Backfill with structural fill and compact to 95% of maximum dry density per ASTM D698.

3.5 BACKFILLING METHODS

A. Do not backfill until tests to be performed on system show system is in full compliance with specified requirements.

B. The Engineer shall inspect all pipe, fittings, connections, and slopes prior to backfilling.
   1. If Contractor backfills trench without Engineer's inspection, Contractor shall uncover all un-inspected buried pipe, bedding and backfill so that it may be properly inspected.
      a. This shall be done at no additional cost to the Owner.

C. Place gravel or bedding material in trench to the lines and slopes established in Drawings.

D. Backfilling procedures shall be modified as necessary and as approved by the Engineer in order to not displace (either horizontally or vertically) piping installed in the trench during backfill or bedding placement.

E. Common Trench Backfill:
   1. Place backfill in lift thicknesses capable of being compacted to densities specified.
   2. Observe specific pipe manufacturer's recommendations regarding backfilling and compaction.
   3. Avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion.

F. Bedding:
   1. Furnish where indicated on Drawings.
   2. Loosely place along middle 1/3 (one-third) of pipe outside diameter. Compact remainder as identified in this Section.
   3. Observe specific manufacturer's recommendations regarding backfilling and compaction.

G. Water flushing for consolidation is not permitted.

3.6 COMPACTION

A. General:
   1. Place and assure bedding, backfill, and fill materials achieve an equal or "higher" degree of compaction than materials adjacent to the work.
   2. In no case shall degree of compaction below "Minimum Compaction" specified be accepted.

3. Compact soils around and on top of pipe using handheld or handheld-pneumatic tampers in areas designated as Carefully Compacted Backfill.
    a. Take necessary precautions to prevent damage to both horizontal and vertical components of the piping.

B. Compaction Requirements:
1. Unless noted otherwise on the Contract Drawings or other Sections of these Specifications, comply with following trench compaction criteria:

LOCATION	MINIMUM COMPACTIONS SOIL TYPE	DENSITY
Common Trench Backfill	Cohesive soils	95% of max dry density by ASTM D698
Carefully Compacted Backfill	Cohesive soils	95% of max dry density by ASTM D698
Bedding Material: All locations	Granular soils	90% of max dry density by ASTM D698

3.7 FINISH GRADING

A. Regrade all areas disturbed by construction operations.
1. Grade to smooth, uniformly sloping surfaces to match existing grade elevations or to finish elevations shown on the Contract Drawings.
2. Grading shall be to a tolerance of minus 0.0 to plus 0.2 FT.
3. Evenly slope finished grade away from structures to provide drainage.

B. Ensure a surface free of debris, roots, or angular stones.

C. Ensure rutting or raveling is not caused by installation equipment or weather.

3.8 FIELD QUALITY CONTROL

A. Pipe Survey:
1. Contractor shall verify by survey techniques that pipe slope meets the requirements specified in the Drawings at 50 FT intervals along all trenches and pipes and record such information in the project notes.
    a. See Section 01 71 23 for surveying requirements.
    b. The surveyed elevations and calculated change in elevation and slope for each 50 FT section shall be recorded in the Record Drawings.
    c. A trench laser will not be considered acceptable survey equipment for the purpose of verifying pipe slope.

B. Testing:
1. See Section 02 65 00.
2. Cost associated with "Failing" tests shall be paid by Contractor.
3. Assure Owner or Engineer has immediate access for inspection of all soils related work.
4. Ensure excavations are safe at all times for testing personnel.
    a. If special safety equipment is required to access areas to be tested Contactor shall provide Owner testing personnel appropriate personal protections equipment, excluding steel toed boots.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 31 25 00
SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Soil erosion and sediment control.

B. Related Sections include but are not necessarily limited to:
1. Division 00 - Procurement and Contracting Requirements.
2. Division 01 - General Requirements.
3. Section 01 33 00 - Submittals.
4. Section 01 25 13 - Product Substitutions.
5. Section 31 10 00 - Site Clearing and Preparation.
6. Section 31 23 00 - Earthwork.
7. Section 32 92 00 - Seeding.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
1. Erosion control standards: "Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas: by the U.S. Department of Agriculture (USDA standards), Soil Conservation Service, College Park, Maryland.
2. ASTM International (ASTM):
a. D3786, Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Testing Method.
b. D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
c. D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
d. D4833, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
3. Statewide Urban Design and Specifications (SUDAS).

1.3 SUBMITTALS

A. Shop Drawings:
1. See Section 01 33 00.
2. Product technical data including:
a. Acknowledgement that materials submitted meet requirements of these Specifications and of standards referenced.
b. Manufacturer's installation instructions and proposed details, if different than Specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Erosion Control Matting/Erosion Control Blankets: American Excelsior, Curlex I CL.

B. Silt Fence: Per SUDAS Section 9040.2.13.

C. Erosion Control Mulch: Per SUDAS Section 9040.2.16.

D. Mulch:
1. SUDAS Standard Specifications 2020, Section 9040.2.16 - Erosion Control Mulch – Conventional Mulch.

E. Dust Control:
   1. SUDAS Standard Specifications 2020, Section 9040.2.15 - Dust Control.

F. Stabilization Construction Entrance:
   1. SUDAS Standard Specifications 2020, Section 9040.2.14 - Stabilization Construction Entrance.

G. Silt Fence:
   1. SUDAS Standard Specifications 2020, Section 9040.2.13 – Silt Fence.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to initiation of major earthwork activities:
   1. Install perimeter dikes and swales, including and berms required to divert storm water from cell liner construction areas.
   2. Machine compact all berms, dikes and embankments.
   3. Install necessary controls to control/prevent discharges.
      a. Identify locations within limits of construction where additional erosion protection is necessary and install such controls.
      b. Provide supplemental erosion control measures where necessary (USDA standards).

3.2 SERVICES PROVIDED BY OWNER

A. NPDES Preparation and Submittal, including Notice of Intent (NOI), is not necessary for this project. Project work is anticipated to fall under the Owner's existing Industrial Storm Water General Permit. See Specification Section 01 35 05 for specifics.

B. Obtain required Erosion and Sediment Control permits and approvals from local jurisdiction.

3.3 SERVICES PROVIDED BY CONTRACTOR

A. SWPPP Management: SUDAS Standard Specifications 2020, Section 9040.3.02.
   1. Contactor will identify any required changes necessitated by Contractor's Work.
   2. Coordinate construction with SWPPP and required controls to verify that all Work related releases pass through an erosion and sediment control measure of adequate design and construction.
      a. Identify to Owner any required changes to SWPPP in accordance with SUDAS Standard Specifications 2020, Section 9040.1.07 - Special Requirements.

B. Erosion and Sediment Control Inspection: SUDAS Standard Specifications 2020, Section 9040.3.03.
   1. Contractor will be responsible for maintenance and repair of Contractor provided controls.
   2. Contractor shall replace any erosion and sediment control measures installed by Owner or Contractor and damaged or removed by Contractor, including damage by lack of maintenance.

C. Silt Fences: SUDAS Standard Specifications 2020, Section 9040.3.18.
   1. Contractor will provide any additional Silt Fence as shown on Drawings and any other controls necessitated by alternate construction methods or locations at no additional cost.

D. Control soils on site such that track-out onto Owner Main Access Road does not occur.

E. Dust Control:
   1. SUDAS Standard Specifications 2020, Section 9040.3.20 - Dust Control.

F. Stabilization Construction Entrance:
   1. SUDAS Standard Specifications 2020, Section 9040.3.19 - Stabilization Construction Entrance.

G. Mulch:
   1. SUDAS Standard Specifications 2020, Section 9040.3.21 - Erosion Control Mulching.

3.4 INSTALLATION

A. Install all erosion and sediment controls in accordance with Manufacturer's Specifications or local municipal standards.

B. Erosion Control Matting:
   1. Prepare soil before installing matting, including fine grading, removal of any debris or other unsuitable soils, repair of rill erosion, placing topsoil, application of soil amendments, fertilizer and seed.
   2. Anchor the ends of the matting using anchor trenches.
      a. Backfill and compact the anchor trench after stapling/staking the mat in place.
      b. Apply seed to compacted soil in anchor trench and fold matting back over seed and compacted soil. Staple matting flap in place.
      c. All matting must be securely fastened by placing staples/stakes or other approved means in manufacturer recommended locations and frequencies.
      d. Overlap edges of adjacent rolls at a minimum of 2 IN.
   3. Consult manufacturer and SUDAS Section 9040.3.08 for additional requirements.

C. Silt Fence:
   1. Per SUDAS Section 9040.3.18 and SUDAS Figure 9040.119.

D. Erosion Control Mulch: Per SUDAS Section 9040.3.21.

3.5 DURING CONSTRUCTION PERIOD

A. Maintain Controls, Etc.:
   1. Inspect regularly especially after rainstorms greater than 0.5 IN in 24 HRS.
   2. Repair or replace damaged or missing items.

B. Construct inlet protection as soon as possible.

C. Provide necessary swales, dikes and berms to direct all water towards and into sediment basins and traps and away from any excavation and construction areas.

D. Do not disturb existing vegetation (grass and trees) except where necessary to allow construction. Any disturbance to existing vegetation not required as part of the construction shall be reseeded by the Contractor at no additional cost to the Owner in accordance with Specification Section 32 92 00.

E. Excavate sediment out of basins and traps when capacity has been reduced by 50 PCT and at end of project.
   1. Remove sediment to prevent overtopping.
   2. Remove sediment at completion of Project.
   3. Sediment trapped by this practice shall be uniformly distributed on the source area prior to topsoiling or at location approved by Owner.

3.6 NEAR COMPLETION OF CONSTRUCTION

A. Eliminate temporary basins, dikes, traps, berms, etc. constructed as part of this project.

B. Grade to finished grades.

C. Fine grade drainage ways and remaining earth areas.

D. Remove sediment from culverts which have been impacted by construction.

E. Remove all temporary controls, unless designated to remain.

F. Seed and stabilize areas that require repair.

G. Install supplemental Erosion Control Mattings and other controls.

END OF SECTION

SECTION 31 32 19
GEOTEXTILES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Non-woven geotextile material used as a cushion layer between the bottom liner HDPE geomembrane and the drainage layer and as a filter layer between coarse aggregate and cohesive soils.
   2. Roadway geotextile.

B. Related Sections:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 23 00 - Earthwork.
   4. Section 31 25 00 - Soil Erosion and Sediment Control.
   5. Section 33 34 61 - High-Density Polyethylene (HDPE) Geomembrane Liner.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. D4355, Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
      b. D4491, Water Permeability of Geotextiles by Permittivity.
      c. D4533, Trapezoid Tearing Strength of Geotextiles.
      d. D6241, Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
      e. D4632, Grab Breaking Load and Elongation of Geotextiles.
      f. D4751, Determining Apparent Opening Size of A Geotextile.
      g. D4759, Determining the Specification Conformance of Geosynthetics.
      h. D4873, Identification, Storage, and Handling of Geosynthetic Rolls.
      i. D5261, Test Method for Measuring Mass Per Unit Area of Geotextiles.

B. Qualifications:
   1. Each manufacturing, fabricating firm shall demonstrate 5 years continuous experience, including a minimum of 10,000,000 SQFT of geotextile installation in the past 3 years.
   2. Installing firm shall demonstrate that the site Superintendent or Foreman has had responsible charge for installation of a minimum of 1,000,000 SQFT of geotextile.
   3. Installer shall attend pre-installation conference.

C. Certifications:
   1. Certifications are required for various aspects of the project related to the geotextiles used in the liner system construction.
      a. Unless alternately approved, the certificates provided at the end of Section 33 34 61 shall be used and no alterations, additions, deletions, or exception shall be made to the specified language.

1.3 DEFINITIONS

A. Manufacturer:
   1. Manufacturer producing geotextile sheets from resin and additives.

B. Installer:
   1. The Installers are the individuals actually performing the hands-on work in the field.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00.
   2. Manufacturer's documentation that raw materials and roll materials comply with required geotextile physical properties.
   3. Manufacturer and Installer quality control manuals and product data.
   4. Test results for resins, roll material and factory seam tests at frequency specified in respective quality control manuals.
      a. Results shall include or bracket the rolls delivered for use in the Work.
      b. No faxed copies.
   5. Proposed details of anchoring and overlapping if different from those included in Contract Documents.

B. Miscellaneous Submittals:
   1. For all geotextiles installed within the liner area, submit written certification that:
      a. Utilize certification forms from Section 33 34 61 unless alternately approved.
         1) Make appropriate number of copies, as required.
         2) Complete and sign appropriate form daily.
      b. The geotextile material delivered to site meets the requirements of this Specification.
      c. The geotextile was received and accepted in undamaged condition from shipper.
      d. The geotextile was installed in accordance with this Specification and with approved Shop Drawings.
      e. The geotextile joints were inspected for continuity and passed all inspections.
         1) All test and inspection data shall be incorporated into this certification.
      f. The drainage layer on top of the geotextile was placed properly and carefully.
   2. For needle punched geotextiles, the Manufacturer shall certify that the geotextile has been continuously inspected using permanent on-line full-width metal detectors and does not contain any needles which could damage other geosynthetic layers.
   3. Qualification documentation specified in Article 1.2.

1.5 DELIVERY, STORAGE AND HANDLING

A. See Section 01 65 50.

B. Label, handle, and store geotextiles in accordance with ASTM D4873 and as specified herein. Rolls shall be stored no more than 3-rolls high.

C. Wrap each roll in an opaque and waterproof layer of plastic during shipment and storage.
   1. Do not remove the plastic wrapping until deployment.

D. Label each roll with the manufacturer’s name, geotextile type, lot number, roll number, and roll dimensions (length, width, gross weight).

E. Repair or replace geotextile or plastic wrapping damaged as a result of storage or handling, as directed.

F. Do not expose geotextile to temperatures in excess of 71 DEGC (160 DEGF) or less than 0 DEGC (32 DEGF) unless recommended by the manufacturer.

G. Do not use hooks, tongs or other sharp instruments for handling geotextile.
   1. Do not lift rolls lifted by use of cables or chains in contact with the geotextile.
   2. Do not drag geotextile along the ground.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:
   1. Propex Geosynthetics.
   2. GSE Lining Technology, Inc.
   3. TenCate Mirafi.
   4. SKAPS Industries.
   5. Tenax.

2.2 MATERIALS AND MANUFACTURE

A. Geotextile:
   1. Non-woven pervious sheet of polymeric material.
   2. Geotextile fibers:
      a. Long-chain synthetic polymer composed of a minimum of 85% polyesters, or polypropylene.
      b. Filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure.
      c. Do not add reclaimed or recycled fibers or polymer to the formulation.
   3. Form geotextile into a network such that the filaments or yarns retain dimensional stability relative to each other, including the selvages.
   4. The geotextile physical properties shall equal or exceed the minimum average roll values listed below.
      a. Values shown are for the weaker principal direction.
      b. Acceptance of geotextile shall be in accordance with ASTM D4759.
      c. Geotextile (8 OZ) as a filter layer between coarse aggregate and cohesive soils:

PROPERTY	TEST METHOD	MINIMUM AVERAGE ROLL VALUE
Mass per Unit Area, OZ/SY	ASTM D5261	≥8
AOS, U.S. Sieve	ASTM D4751	70-100
Permittivity, SEC-1	ASTM D4491	≥0.5
Static Puncture, LBS	ASTM D6241	≥90
Grab Tensile, LBS	ASTM D4632	≥250
Trapezoidal Tear, LBS	ASTM D4533	≥90
Ultraviolet Degradation PCT retained @ 500 HRS	ASTM D4355	≥70
Sewn Seam Strength, LBS	ASTM D4632	≥220

      d. Geotextile (12 OZ) as cushion between HDPE geomembrane and drainage layer:

PROPERTY	TEST METHOD	MINIMUM AVERAGE ROLL VALUE
Mass per Unit Area, OZ/SQYD	ASTM D5261	≥12
AOS, U.S. Sieve	ASTM D4751	≥100
Permittivity, SEC-1	ASTM D4491	≥0.8
Static Puncture, LBS	ASTM D6241	≥800

PROPERTY	TEST METHOD	MINIMUM AVERAGE ROLL VALUE
Grab Tensile, LBS	ASTM D4632	≥300
Trapezoidal Tear, LBS	ASTM D4533	≥115
Ultraviolet Degradation % retained @ 500 HRS	ASTM D4355	≥70
Sewn Seam Strength, LBS	ASTM D4632	≥240

B. Thread:
   1. High-strength polyester, nylon, or other approved polymeric thread type.
   2. Equivalent chemical compatibility and ultraviolet light stability as the geotextile.
   3. Contrasting color with the geotextile.

C. Roadway Geotextile:
   1. Roadway geotextile shall be Mirafi 500X, or approved equal. Contractor to submit product data for roadway geotextile or alternatively, a proposed or-equal product for consideration.

PART 3 - EXECUTION

3.1 PREPARATION

A. Substrate HDPE geomembrane for the geotextiles shall be smooth and free of protrusions which could damage the geotextiles.

3.2 INSTALLATION

A. Install geotextiles in accordance with manufacturer's written recommendations.

B. Hand place geotextile.
   1. No equipment will be permitted to traffic in direct contact with the geotextile.
   2. Do not drag geotextile for deployment.

C. Lay geotextile smooth so as to be free of tensile stresses, folds, and wrinkles.

D. Seam Construction:
   1. Sew all geotextile seams unless shown otherwise.
   2. Broom clean to provide a clean area for seaming geotextile.
   3. Sew seams continuously using an SSA flat seam with one row of a two-thread 401 chain stitch unless otherwise recommended by the manufacturer.
      a. If seams are approved on slopes greater than 10 horizontal to 1 vertical provide two (2) rows of stitching.
   4. Minimum distance from the geotextile edge to the stitch line nearest to that edge:
      a. 2 IN unless otherwise recommended by the manufacturer.
   5. Tie off thread at the end of each seam to prevent unraveling.
   6. Construct seams on the top side of the geotextile to allow inspection.
   7. Sew skipped stitches or discontinuities with an extra line of stitching with 18 IN of overlap.
   8. Seams shall be oriented downslope perpendicular to grading contours unless otherwise approved.

E. Where applicable, fabricate and install geotextile socks around leachate clean-out riser, landfill gas wells, and at pipe terminations:
   1. Extend socks 5 FT along riser or pipe.
   2. Continuously heat bond all seams and aprons.
   3. Seal the upper end of each sock with 2 cable ties around riser or pipe.

F. Place cover soil in accordance with Section 31 23 00.

G. Protect geotextiles from clogging, tears, and other damage during installation.

H. Geotextile Repair:
   1. Place a patch of the same type of geotextile which extends a minimum of 12 IN beyond the edge of the damage or defect.
   2. Fasten patches continuously using a sewn seam or other approved method.
   3. Align machine direction of the patch with the machine direction of the geotextile being repaired.
   4. Replace geotextile which cannot be repaired.

I. Use adequate ballast (e.g., sandbags) to prevent uplift by wind.
   1. Do not throw or slide sandbags on surface of geotextile.

J. Do not use staples or pins to hold the geotextile in place in areas underlain by HDPE geomembranes.

K. Cover the geotextile within 14 days.

3.3 FIELD QUALITY CONTROL

A. See CQA Plan

B. Acceptance:
   1. The Owner will accept the geotextile system installation when the installation is finished and all required documentation from the Contractor, Manufacturer, Inspector and Installer has been received and approved, and verification of the adequacy of all field seams is complete.
   2. Submittal of such documentation shall be a condition precedent to Substantial Completion.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 31 32 20
12 MIL SCRIM REINFORCED GEOMEMBRANE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Furnishing, installation, quality control, and testing of a scrim reinforced geomembrane rain cover.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 23 00 - Earthwork.
   4. Section 33 34 61 - High-Density Polyethylene (HDPE) Geomembrane Liner.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Standards for Testing and Materials (ASTM):
      a. D751, Standard Test Methods for Coated Fabrics.
      b. D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
      c. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
      d. D5199, Standard Test Method for Measuring the Nominal Thickness of Geosynthetics.
      e. D7003, Standard Test Method for Strip Tensile Properties of Reinforced Geomembranes.
      f. D7004, Standard Test Method for Grab Tensile Properties of Reinforced Geomembranes.
      g. E96, Standard Test Methods for Water Vapor Transmission of Materials.
   2. Geosynthetic Research Institute (GRI):
      a. GM22, Test Methods, Required Properties and Testing Frequencies for Scrim Reinforced Polyethylene Geomembranes used in Exposed Temporary Applications.

B. Quality Assurance Testing by Owner:
   1. The Owner or Engineer's Representative may conduct additional independent testing to support construction quality assurance program and to provide documentation of such to appropriate regulatory agencies.
   2. Facilitate and provide opportunities as required.

C. Qualifications:
   1. Manufacturer: Demonstrate five (5) years continuous experience with a minimum of 10,000,000 SQFT of geomembranes.
   2. Installer:
      a. Demonstrate three (3) years continuous experience with a minimum 500,000 SQFT of scrim reinforced geomembranes in solid waste landfills.
   3. Installer Supervisor/Foreman:
      a. Demonstrate two (2) years continuous experience working in a similar capacity during installation of a minimum of 500,000 SQFT of 12 MIL scrim reinforced geomembrane.
   4. Installation Personnel:
      a. For seaming and testing personnel shall have previously completed 500,000 SQFT of 12 MIL scrim reinforced performing the same function.

D. Certifications:
   1. Certifications are required for various aspects of the project related to the geomembrane construction.
      a. Unless alternately approved, the certificates provided at the end of Section 33 34 61 shall be used and no alterations, additions, deletions, or exception shall be made to the specified language.

1.3 DEFINITIONS

A. Manufacturer:
   1. Manufacturer producing geomembrane sheets from resin and additives, and/or fabricating special items from polyethylene materials.

B. Installer:
   1. Party responsible for field handling, transporting, storage, deployment, seaming, and field testing.

C. Independent Testing Laboratory:
   1. The firm hired by the Contractor to perform testing as required.
   2. Firm shall be acceptable to Engineer and the Owner.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
   2. Submit for Engineer's approval Shop Drawings, including:
      a. Manufacturer's certification that raw materials and sheet materials comply with required material properties.
      b. Manufacturer/Fabricator and Installer quality control manuals.
         1) Identify all field procedures and installation/construction quality assurance methods.
         2) Procedures shall be no less stringent than these Specifications, unless otherwise approved by Engineer.
         3) Manufacturer's requirements and procedures will govern in the event of a conflict with Fabricator or Installers quality control manuals.
      c. Provide certification of Installer Supervision/Foreman and Installer's training (unless Installer is certified by other acceptable manufacturer list herein), experience and methods for seaming and inspecting geosynthetic materials installations in compliance with Manufacturer's standards and with Quality Assurance requirements of this Specification (Article 1.2).
      d. Provide qualifications and experience of key installation personnel involved in installation, seaming, testing and inspection of the geosynthetic materials.

B. Miscellaneous Submittals:
   1. Test results:
      a. Resin tests, tests of sheet material and factory seam tests at frequency specified in respective quality control manuals demonstrating the material meets the requirements of paragraph 2.2 of this Specification Section.
         1) Results shall include or bracket the material delivered for use in the Work.
   2. Warranties as described below.
   3. Submit written certifications that:
      a. Utilize certification forms from Section 33 34 61 unless alternately approved.
         1) Make appropriate number of copies, as required.
         2) Complete and sign appropriate form daily.
      b. The geomembrane material delivered to site meets the requirements of this Specification.
      c. The geomembrane was received and accepted in undamaged condition from shipper.

d. The subgrade has been properly prepared and acceptable for the placement of the geomembrane.
e. The geomembrane liner was installed in accordance with this Specification and with approved Shop Drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle and store geomembrane in accordance with the manufacturer's recommendations.

B. Label each roll with the manufacturers name, type, lot number, roll number, and roll dimensions (length, width, gross weight).
   1. Repair or replace geomembrane or plastic wrapping damaged as a result of storage or handling, as directed.

C. Do not use hooks, tongs or other sharp instruments to handle the geomembrane.
   1. Do not lift rolls by use of cables or chains in contact with the geomembrane.
   2. Do not drag geomembrane along the ground.

1.6 WARRANTIES

A. Written warranties addressing geomembrane material and installation workmanship shall be furnished by the Contractor and shall be made to the Owner.

B. Submit warranties prior to shipment.

C. Suitability of geosynthetic rain cover shall be subject to Owner approval of warranty.
   1. The Manufacturer's warranty shall state that the furnished material meets all requirements of the Contract Drawings and Specifications and that under local atmospheric conditions the sheet material is warranted for 2 years, prorated.
   2. The Installer's warranty shall state that the materials were properly installed, properly (field and factory) seamed and will not fail within 2 years of the installation under similar conditions.
      a. Warranty shall not be prorated.

D. Warranties shall provide for complete repair/replacement at no additional cost to the Owner for the warranty period.

1.7 PROJECT/SITE CONDITIONS

A. When the weather is of such a nature as to endanger the integrity and quality of the installation whether this is due to rain, high winds, cold temperatures, or other weather elements, stop the installation until the weather conditions are satisfactory.

B. Ensure that adequate dust control methods are in effect to prevent the unnecessary accumulation of dust and dirt on surfaces which hamper efficient field seaming or performance.

C. Maintain surface water drainage diversions around the work area and provide for the disposal of water which may collect in the work area directly from precipitation falling within the area or from inadequate diversion structures or practices.

D. Coordinate with the installation of the leachate collection system, to the extent applicable.
   1. See additional requirements on Drawings.

E. Vehicles will not be allowed to drive directly on the geomembrane.

F. When damage is suspected, repair damage if required, at no cost to the Owner.
   1. Suspect areas may be identified by the Owner or Engineer.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents the following Manufacturers are acceptable:
   1. Geomembrane liners:
      a. Raven Industries.
      b. Approved equal.

2.2 MATERIALS

A. Geomembrane (Rain Cover):
   1. Consist of reinforced polyethylene.
      a. Geomembrane: Thickness 12 MILS.
      b. Manufactured from virgin, first quality resin designed and formulated specifically for exposed applications.
   2. Manufactured to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter.
      a. Any such defects shall be cause for rejection of the material.
      b. Minor defects may be repaired in accordance with Manufacturer's recommendations if approved by the Engineer.
   3. Manufactured as seamless rolls or as prefabricated panels.
      a. All factory seams shall be inspected prior to delivery to the site.
   4. Specifications:
      a. Geomembrane shall possess properties which meet or exceed the following minimum GRI GM-22 requirements:

PROPERTY	TEST METHOD	RAIN COVER
Thickness (1)	ASTM D751	10 MILS (12 MIL nominal)
Density (min. ave.)	D1505/D792	0.930 g/cc
Tensile Properties (min. ave.)		
- grab tensile strength - grab tensile elongation - strip tensile strength - strip tensile elongation	ASTM D7004 ASTM D7004 ASTM D7003 ASTM D7003	76 LB/IN 15% 51 LBS 15%
Tongue Tear	ASTM D5884	40 LBS
CBR Puncture (min. ave.)	ASTM D6241	220 LBS
Water Vapor Transmission (WVT)	ASTM E96	0.7 g/m^2 - day (maximum)
UV Resistance	ASTM D7238	50%

(1) Thickness measured in the valleys created by the scrim reinforcement

2.3 EQUIPMENT AND ACCESSORIES

A. Seaming Equipment:
   1. Maintained in adequate numbers to avoid delaying work.
   2. Supplied by a power source capable of providing constant voltage under a combined-line load.
   3. Do not place electric generator directly on the geomembrane.

2.4 MANUFACTURE AND FABRICATION

A. Produce geomembrane sheet which complies with this Specification.

B. Provide resin and additive quality control.

C. Fabricated Specials:
   1. Subject to same level of manufacturer's quality control.
   2. Fabricated from project rolls.
      a. Provide traceability of resin and roll stock.

PART 3 - EXECUTION

3.1 GEOSYNTHETIC RAIN COVER

A. Geomembrane Subgrade (Drainage Layer):
   1. Protect drainage layer at all times from damage until such time as the placement of geomembrane and other components of the geosynthetic rain cover are complete.
   2. See Section 31 23 00.

B. Anchorages:
   1. As detailed on the Drawings.
   2. Excavation, backfill and compaction shall be in accordance with Section 31 23 00.

C. Geomembrane:
   1. General:
      a. Installer of geomembranes is responsible for handling, fitting, and seaming.
      b. These responsibilities include but are not limited to:
         1) Acceptance (in writing) of the geomembrane materials from the transporter.
         2) Shall state that the Installer has inspected the surface, and reviewed the Specifications for material and placement, and finds all conditions acceptable for placement of geomembrane liners.
         3) Shall explicitly state any and all exceptions to acceptance.
         4) Handling, seaming and repair of geomembranes in compliance with this Specification and with written procedures manuals prepared by the Manufacturer or Fabricator.
            a) Geomembrane shall not be placed upon frozen foundation, standing water or other conditions which will result in deterioration of the foundation.
            b) Geomembrane liner materials shall be laid out according to plans previously approved by the Engineer.
            c) Adjacent rolls of geomembrane shall overlap a minimum of 3 IN, provided that greater overlap may be required to allow seaming in accordance with the Manufacturer's instructions.
         5) Repair or replacement of defects in the geosynthetic materials as required by the Engineer.
   2. Panel deployment:
      a. Place panels with minimal handling.
         1) Orient sheets to eliminate or minimize number of horizontal seams on side slopes.
         2) Protect panels from tear, puncture or abrasion.
         3) Do not drag sheets for deployment.
      b. Equipment used to deploy the geomembrane shall not rut the drainage layer.
         1) A rut is defined as a 0.1 FT depression over a 10 FT straight-edged length.
      c. Minimize foot traffic.
         1) Do not allow personnel access to wet or slippery liners without adequate safety precautions.
      d. Ballast with sandbags to prevent wind uplift in accordance with Drawings and based on local climatic conditions.
         1) Remove and replace all wind damaged panels at no additional cost to Owner.
         2) Do not throw or slide sandbags across geomembrane.

e. Install geomembrane in stress free, tension free and relaxed condition.
    1) Account for temperature and weather-related impacts when deploying and ballasting.
    2) Stretching to fit and folding are not permitted.
f. Do not allow geomembrane to bubble, fold, or create ripples as a result of installation.
    1) Except as noted on Drawings no folds in geomembrane will be allowed.
g. Any panel exhibiting stretching caused by placement, covering techniques, or wind shall be removed and may not be incorporated in the final construction.

3. Field seaming or sewing:
    a. Perform in accordance with seaming or sewing recommendations furnished by the geomembrane Manufacturer and as approved by the Engineer.
        1) Seams may be welded or sewn, at Contractor's option and in accordance with Manufacturer installation instructions.
    b. Surfaces to be seamed or sewn shall be clean and dry at the time of seaming.
        1) Precipitation and ponding of water on the geomembrane shall cause termination of seaming operations.
    c. A copy of Manufacturer's seaming or sewing instructions shall be available on site at all times and shall not be deviated from without written approval of the Manufacturer and Engineer.
    d. All panels/sheets should be overlapped a minimum of 3 IN.
        1) If horizontal seams are required on side slopes, lap the upper panel over the lower panel.
    e. Do not conduct seaming in the presence of standing water and/or soft subgrades.
        1) Clean the seamed area of dust, dirt and foreign material prior to and during the seaming operation.
    f. Extend seaming or sewing to the outside edge of panels/sheets to be placed in anchor and/or drainage trenches.
    g. Field welds to be tested at a frequency of one test per 1,000-ft in peel.
        1) Field testing shall result in a minimum of 20-ppi.
        2) If field results do not meet the minimum required strength, the seams shall be re-seamed and retested at no additional cost to the Owner.

4. Patching:
    a. Repair defects in and damage to geomembrane sheets by seaming a patch over the defect.
        1) Use an undamaged piece of geomembrane cut to provide a minimum of 6 IN of overlap in all directions from the defect.
        2) Replace torn or permanently twisted geomembrane at no expense to the Owner.

3.2 GEOSYNTHETIC RAIN COVER ACCEPTANCE

A. Contractor shall retain all ownership and responsibility for the geosynthetic rain cover until final acceptance by the Owner.
    1. The Owner will accept the geosynthetic rain cover installation when the installation is finished, repairs are completed, and all required warranties, test results, and documentation from the Contractor, Manufacturer, and Installer has been received and approved.

B. Submittal of such documentation shall be a condition precedent to Substantial Completion.

END OF SECTION

SECTION 31 37 00
STONE REVETMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Stone revetment for protection of slopes and drainage ways against erosion.
      a. Culvert apron inlets and outlets.
      b. Other areas indicated on Drawings.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 23 00 - Earthwork.
   4. Section 31 25 00 - Soil Erosion and Sediment Control.
   5. Section 31 32 19 - Geotextiles.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Association of State Highway & Transportation Officials (AASHTO):
      a. T103, Soundness of Aggregates by Freezing and Thawing.
   2. ASTM International (ASTM):
      a. C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
      b. C127, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
   3. Iowa Department of Transportation (IDOT):
      a. Standard Specifications for Highways and Bridge Construction.

1.3 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00.
   2. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Material and method of installation and details for completed system.
   3. Submit all tests and certification in a single coordinated submittal.
   4. Certified tests and service records of rip rap material.

PART 2 - PRODUCTS

2.1 MATERIALS

A. See Drawings for locations of material types.

B. Revetment Stone:
   1. Erosion Stone:
      a. Shall meet the gradient and quality requirements for Class E Revetment Stone required of Section 4130.04 and 4130.05 of the State of Iowa Department of Transportation Standard Specifications for Highways and Bridge Construction.

C. Geotextile: See Section 31 32 19.

2.2 SOURCE QUALITY CONTROL

A. Perform all tests required to demonstrate source and material specifications are satisfied.

B. Source Tests:
   1. Supply certified tests and service records to document compliance with Specification for revetment stone.
   2. In the event suitable test reports or a service record that is satisfactory are not available, as in case of newly operated sources for revetment stone, subject material to tests necessary to determine its acceptability for use.

C. Material Acceptability Tests:
   1. Initial test on revetment stone material from each source location sampled prior to start of construction:
      a. Specific gravity.
      b. Soundness in magnesium sulfate.
      c. Soundness in freezing and thawing.

D. Specific Gravity Test:
   1. Conform with ASTM C127.
   2. Not less than 2.40 minimum.

E. Soundness in Magnesium Sulfate:
   1. Conform with ASTM C88, except maintain samples immersed in solution at a temperature of 80 DEGF (26 DEGC) +2 DEGF.
   2. Not more than 12 PCT loss at five cycles.

F. Soundness of Aggregates in Freezing and Thawing:
   1. Conform with AASHTO T103 method as modified herein.
   2. Ensure loss at 12 cycles of not more than 10%.
   3. Maintain temperature of cold liquid in range of -5 to 0 DEGF (-20 to -18 DEGC).
   4. Maintain thaw fluid temperature in range of 45 to 50 DEGF (7 to 10 DEGC).
   5. Permit length of freezing and of thawing cycles of 2 HRS with 1 HR of freezing following by 1 HR of thawing.
   6. Perform thawing by circulating thaw fluid around pan containing stone immersed in a depth of 1/4 IN rather than by total immersion.

PART 3 - EXECUTION

3.1 FOUNDATION PREPARATION

A. General:
   1. Areas on which geotextile and revetment stone materials are to be placed shall be constructed on a minimum 12 IN thick compacted structural fill unless otherwise noted and to the lines and grades shown on the Drawings and to the tolerances specified in the Contract Documents and approved by the Engineer.
   2. Care shall be taken in areas of geosynthetics to ensure subgrade preparation does not damage those materials.

B. Grading:
   1. Grade to a smooth plane surface to provide intimate contact between the ground and the geotextile and between the geotextile and the interface surface of the revetment stone.
      a. All surface deformities, roots, grade stakes, clods, and stones which project normal to the local ground surface must be regraded or removed.
      b. No holes, “pockmarks”, slope board teeth marks, footprints, or other voids greater than 1 IN in depth normal to the local ground surface shall be permitted.
      c. No grooves or depressions greater than 0.5 IN in depth normal to the local ground surface with a dimension exceeding 1 FT in any direction shall be permitted.
      d. Compact subgrade and structural fill to density specified in accordance with Section 31 23 00.
   2. Correction:
      a. Defective areas shall be brought to grade by placing compacted structural fill material.

b. The ground surface shall be uniformly compacted.
c. Depth of layers, homogeneity of soil and amount of compaction shall be as specified for structural fill soils.

3.2 PLACEMENT OF GEOTEXTILE

A. General: Placed within the limits shown on the Contract Drawings.

B. Placement:
1. Placed free of folds or wrinkles.
2. Upstream strip of fabric overlaps the downstream strip.
3. Longitudinal and transverse joints shall be overlapped at least 2 FT in drainage areas; sewn seam are required above the HDPE geomembrane liner.
4. Extend at least 1 FT beyond the revetment or riprap termination points.
5. Extends along all soil and revetment or riprap interfaces.
6. Provide anchor trenches where shown on Drawings or referenced standards.

3.3 PLACING OF REVETMENT STONE

A. Place revetment stone material on prepared subgrade and geotextile within limits indicated.

B. Place on prepared subgrade to produce a well-graded mass of stone with minimum percentage of voids. Take care when placing revetment stone material not to damage geotextile or surrounding grades.

C. Place to required thickness and grades.

D. Place to full thickness in a single operation to avoid displacing the underlying material.

E. Distribute entire mass to conform to gradation specified.
1. Do not place stone by dumping into chutes or by similar method likely to cause segregation.

F. Keep finished revetment stone free from objectionable pockets of small stones or clusters of larger stone.
1. Hand place as necessary to obtain a well-graded distribution.

G. Ensure a final tolerance of within minus zero to plus 4 IN.

H. Maintain revetment stone until accepted.

I. Replace any displaced material to lines and grades shown.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

DIVISION 32

EXTERIOR IMPROVEMENTS

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 31 13
CHAIN LINK FENCE AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Chain link fencing and gates.

B. Related Specification Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 23 00 - Earthwork.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
      b. A392, Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
      c. A824, Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use with Chain-Link Fence.
      d. F552, Standard Terminology Relating to Chain Link Fencing.
      e. F567, Standard Practice for Installation of Chain-Link Fence.
      f. F626, Standard Specification for Fence Fittings.
      g. F900, Standard Specification for Industrial and Commercial Steel Swing Gates.
      h. F1043, Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework.
      i. F1083, Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
   2. American Welding Society (AWS).
   3. National Fire Protection Association (NFPA):
      a. NFPA 70, National Electrical Code (NEC).
   4. Underwriters Laboratories, Inc. (UL).

1.3 DEFINITIONS

A. See ASTM F552.

B. NPS: Nominal pipe size, in inches.

C. Installer or Applicator:
   1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
   2. Installer and applicator are synonymous.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
   2. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
   3. Scaled plan layout showing spacing of components, accessories, fittings, and post anchorage.
   4. Mill certificates.

5. Source quality control test results.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Chain Link Fabric:
   1. Fabric type:
      a. ASTM A392 zinc-coated steel:
         1) Coated before weaving, 2.0 OZ/SF.
   2. Wire gage: 9.
   3. Mesh size: 2 IN.
   4. Fence height: 10 FT.
   5. Selvage treatment:
      a. Top: Knuckled.
      b. Twisted and barbed.
      c. Bottom: Knuckled.

B. Line Post:
   1. ASTM F1083 pipe:
      a. Schedule 40, NPS 2.

C. Corner or Terminal Posts:
   1. ASTM F1083 pipe:
      a. Schedule 80, NPS 2-1/2.

D. Brace and Rails:
   1. ASTM F1083 pipe:
      a. Schedule 40, NPS 1-1/4.

E. Tension Wire:
   1. Top and bottom of fabric:
      a. ASTM A824, galvanized steel, Class 3.

F. Fence Fittings (Post and Line Caps, Rail and Brace Ends, Sleeves-Top Rail, Tie Wires and Clips, Tension and Brace Bands, Tension Bars, Truss Rods):
   1. ASTM F626.

G. Swing Gate:
   1. ASTM F900.
   2. Materials as specified for fence framework and fabric.
   3. Hardware:
      a. Galvanized per ASTM A153/A153M.
      b. Hinges to permit 90 DEG in and out gate opening.

2.2 SOURCE QUALITY CONTROL

A. Test related fence construction materials to meet the following standards:
   1. Posts and rails: ASTM F1043, Heavy Industrial.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with:
   1. Manufacturer's instructions.
   2. Lines and grades shown on Drawings.
   3. ASTM F567.

B. Do not start fence installation before final grading is complete and finish elevations are established.

C. Drill holes in firm, undisturbed or compacted soil.

D. Place fence with bottom edge of fabric at maximum clearance above grade, as shown on Drawings.
   1. Correct minor irregularities in earth to maintain maximum clearance.

E. Space line posts at equal intervals not exceeding 10 FT OC.

F. Provide post braces for each gate, corner, pull and terminal post and first adjacent line post.

G. Install tension bars full height of fabric.

H. Rails:
   1. Fit rails with expansion couplings of outside sleeve type.
   2. Rails continuous for outside sleeve type for full length of fence.

I. Provide expansion couplings in top rails at not more than 20 FT intervals.

J. Anchor top rails to main posts with appropriate wrought or malleable fittings.

K. Install bracing assemblies at all end and gate posts, as well as side, corner, and pull posts.
   1. Locate compression members at mid-height of fabric.
   2. Extend diagonal tension members from compression members to bases of posts.
   3. Install so that posts are plumb when under correct tension.

L. Pull fabric taut and secure to posts and rails.
   1. Secure so that fabric remains in tension after pulling force is released.
   2. Secure to posts at not over 15 IN OC, and to rails at not over 24 IN OC, and to tension wire at not over 24 IN OC.
   3. Use U-shaped wire conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two (2) full turns.
   4. Bend ends of wire to minimize hazards to persons or clothing.

M. Install post top at each post.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 91 13
TOPSOILING AND FINISHED GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Topsoiling and finished grading.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 10 00 - Site Clearing and Preparation.
   4. Section 31 23 00 - Earthwork.
   5. Section 31 25 00 - Soil Erosion and Sediment Control.
   6. Section 32 92 00 - Seeding.

C. Location of Work: All areas shown on the Drawings to be seeded and all vegetated areas outside the Limits of Construction shown on Drawings which are disturbed in the course of the Work.

1.2 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00 for requirements for the mechanics and administration of the submittal process.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil:
   1. Original surface soil typical of the area.
   2. Capable of supporting native plant growth.
   3. Blend of onsite soils and onsite compost provided by Owner.

B. Soil Amendments:
   1. Compost.
   2. Straw Mulch.

2.2 TOLERANCES

A. Finish Grading Tolerance for Topsoil:
   1. Minus 0.1, plus 0.2 FT from specified thickness.
      a. Finished elevation shown on Drawings shall include topsoil, where topsoil is designated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Correct, Adjust and/or Repair Rough Graded Areas:
   1. Cut off mounds and ridges.
   2. Fill gullies and depressions.
   3. Perform other necessary repairs.

4. Bring all sub-grades to specified contours and layer thickness, even and properly compacted.

B. Loosen surface to depth of 2 IN, minimum.

C. Remove all stones and debris over 2 IN in any dimension.

3.2 PLACEMENT

A. General
   1. Do not place when subgrade is wet or frozen enough to cause clodding.
   2. Provide finished surface free of stones, sticks, or other material 1 IN or more in any dimension.
   3. Provide finished surface smooth and true to required grades.

B. In the event that adequate quantities of compost for amended topsoil are not present onsite, topsoil shall be used in remaining disturbed areas that are to be vegetated :
   1. Topsoil shall be obtained from on-site sources.
   2. Spread to depth of 6 IN loose, 4 IN compacted.
   3. Thorough mixture of clean soil, topsoil, and soil amendments.

C. Amended topsoil, utilizing owner provided compost, shall be used in lieu of topsoil in other disturbed areas that are to be vegetated as indicated within the Drawings. See Section 32 92 00.

3.3 PLACING COMPOST AS AMENDED TOPSOIL

A. Do not place when subgrade is wet or frozen enough to cause clodding

B. Provide finished surface free stones, sticks, or other material 1 IN or more in any dimension.

C. Provide finished surface smooth and true to required grades.

D. Restore stockpile area to condition of rest of finished work.

E. Amended topsoil:
   1. Load and haul Owner-provided compost from the location shown on the Drawings to all areas to receive seeding. Place and spread compost to an approximate depth of 3 IN. Disk the compost approximately 4 IN to 6 IN deep into the underlying soil.

3.4 ACCEPTANCE

A. Upon completion of topsoiling, obtain Engineer's acceptance of grade and surface.

B. Make test holes if directed to verify proper placement and thickness of topsoil.

END OF SECTION

SECTION 32 92 00
SEEDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Seeding within the Cell D and Greene Co. project areas, all areas disturbed by construction activities, and areas as indicated on the Drawings.
   1. Soil preparation.
   2. Lawn-type seeding.
   3. Native grass seeding.
   4. Cover crops.
   5. Maintenance of new materials
   6. Replacement of dead or impaired materials at the end of the first growing season.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 23 00 - Earthwork.
   4. Section 32 91 13 - Topsoiling and Finished Grading.
   5. Section 31 25 00 - Soil Erosion and Sediment Control.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Standard for Nursery Stock (ASNS).
   2. ASTM International (ASTM):
      a. D5276, Standard Test Method for Drop Test of Loaded Containers by Free Fall.
   3. Iowa Statewide Urban Standard Specifications for Public Improvements (SUDAS).
   4. Iowa Seed Law.
   5. Iowa Department of Agriculture Regulations.
   6. Standard Methods of the Association of Official Agricultural Chemists.
   7. United States Department of Agriculture, (USDA):
      a. Federal Seed Act.
      b. Soil Conservation Service.

B. Quality Assurance Testing:
   1. If Engineer determines fertilizer requires sampling and testing to verify quality, testing will be done at Contractor's expense, in accordance with current methods of Association of Official Agricultural Chemists.
      a. Upon completion of Project, a final check of total quantities of fertilizer used will be made against total area seeded.
      b. If minimum rates of application have not been met, Contractor will be required to distribute additional quantities to make up minimum application specified.

1.3 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00.
   2. Manufacturer's planting and installation instructions.
   3. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Signed copies of vendor's statement for seed mixture required, stating botanical and common name, place of origin, strain, percentage of purity, percentage of germination, and amount of Pure Live Seed (PLS) per bag.

4. Certification:
   a. Certify each container of seed delivered will be labeled in accordance with Federal and State Seed Laws and equals or exceeds Specification requirements.

B. Miscellaneous Submittals:
   1. See Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
   2. Copies of invoices for fertilizer used on Project showing grade furnished, along with certification of quality and warranty.

C. Equipment or methods to be utilized if different from those specified.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Furnish seed in sealed standard containers labeled with producer's name and seed analysis.
   1. Remove from the site seed which has become wet, moldy or otherwise damaged in transit.

B. Furnish fertilizer uniform in composition, free flowing and suitable for application with approved equipment, delivered to site in bags or other containers, each fully labeled and bearing the name, and warranty of the producer.

1.5 SEQUENCING AND SCHEDULING

A. Installation Schedule:
   1. Show schedule of when perennial grasses are anticipated to be planted.
   2. For seeding, follow requirements of SUDAS Section 9010.1.06.
   3. Indicate planting schedules in relation to schedule for finish grading and topsoiling.
   4. Indicate anticipated dates Owner will be required to review installation for initial acceptance and final acceptance.

B. Pre-installation Meeting:
   1. Meet with Owner and other parties as necessary to discuss schedule and methods, unless otherwise indicated by Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

A. Submit request for substitutions in accordance with Section 01 25 13 and SUDAS section 9010.1.04 for seeding and Section 9030.1.04 for plant materials.

2.2 MATERIALS

A. Seed Quality:
   1. Fresh, clean, new-crop seed labeled in accordance with Iowa Department of Agriculture Rules and Regulations under Iowa Seed Law and U.S. Department of Agriculture Rules and Regulations under Federal Seed Act in effect on date of bidding.
      a. Provide seed of species, proportions and minimum percentages of purity, germination and maximum percentage of weed seed as specified.
      b. Approval of all seed for use shall be based on the accumulative total of PLS specified for each phase of work.

B. Perennial Grass Seeding:
   1. For ditch and channel areas:

GRASSES	LBS PLS PER ACRE

GRASSES	LBS PLS PER ACRE
Big Bluestem (Andropogon gerardi)	2.4
Sideoats grama (Bouteloua certipendula)	2.2
Switch grass (Panicum virgatum)	1.3
Indian grass (Sorghastrum nutans)	2.0
Tall Fescue (Festuca arundinacea)	1.7
Oats (Avena satira)	1/2 bushel

C. Seeding:
1. For top of slope (5% or less):

GRASSES	LBS PLS PER ACRE UNLESS NOTED
Sideoats grama (Bouteloua certipendula)	5.0
Redtop (Agrostis alba)	3.0
Brome grass (Bromus inermis)	7.0
Red clover (Triflium pretense)	4.0
Oats (Avena satira)	1/2 bushel
Blackeyed Susans (Rudbeckia hirta)	4.0 OZ
Showy partridge pea (Cassia chamaecrista)	4.0 OZ
Timothy (Pleum pretense)	3.0
Orchard grass (Dactylis glomerata)	3.0

2. For Sideslope (greater than 5%):

GRASSES	LBS PLS PER ACRE UNLESS NOTED
Blue grass (Boutelana gracilis)	4.5
Sideoats grama (Bouteloua certipendula)	10.0
Canada wild rye (Elymus Canadensis)	1.0
Blackeyed Susans (Rudbeckia hirta)	4.0 OZ
Showy partridge pea (Cassia chamaecrista)	4.0 OZ
Gray headed cornflower (Ratibida pinnata)	4.0 OZ
Redtop (Agrostis alba)	3.0
New England aster (Aster novaeangliae)	4.0 OZ
Oats (Avena satira)	1 bushel

D. Mulch:
1. Only in areas shown on Drawings which are not designated to receive Rolled Erosion Control Products blankets or other structural erosion control products.
2. Perennial grass seeded areas, top of slope, sideslope, and ditch seeded areas:

a. Clean, seed-free, threshed straw of oats, wheat, barley, rye, beans, peanuts, or other locally available mulch material which does not contain an excessive quantity of matured seeds of noxious weeds or other species that will grow or be detrimental to seeding, or provide a menace to surrounding land.
b. Do not use material which is fresh or excessively brittle, or which is decomposed and will smother or retard growth of grass.
1) SUDAS Section 9010.2.07.

E. Fertilizer:
1. Commercial fertilizer meeting applicable requirements of State and Federal law.
2. Cyanic compound or hydrated lime not permitted in mixed fertilizers.
a. Owner may test soils prior to installation.
1) Verify that mix will not change prior to installation and ordering of product.
b. All areas:
1) Phosphate (P_2O_5) 30 LBS per acre.
2) Nitrogen (NH_4NO_3) 30 LBS per acre.

F. Soil Amendments: See Section 32 91 13.

G. Herbicide:
1. Perennial grass areas:
a. 2, 4-D, 1 pint to 1 quart per acre.
1) Broadleaf control.
b. Glyphasate (Round Up), terminate weed growth.
c. Banvel, Canada Thistle control.

PART 3 - EXECUTION

3.1 SOIL PREPARATION

A. General:
1. Limit preparation to areas which will be planted soon after.
2. Verify location and existence of all underground utilities.
a. Take necessary precaution to protect existing utilities from damage due to construction activity.
b. Repair all damages to utility items at Contractor's sole expense.
3. Provide facilities to protect and safeguard all persons on or about premises.
4. Soil amendments utilizing Owner provided compost shall be added to upper ground surface.
a. Compost is stockpiled in locations shown on the Drawings. Contractor to haul compost from existing location shown on Drawings and temporarily stockpile for reapplication.
b. Load, haul and dump compost on areas to be vegetated.
c. Spread compost to a depth of approximately 2 IN evenly over all areas to be seeded using stockpiled compost, and incorporate into the ground surface by disking to a depth of 6 to 8 IN.

B. Fertilization per SUDAS Section 9010.3.04B.

C. Top of Slope, Sideslopes, Perimeter Ditch and Borrow Source Seeding:
1. Following establishment of final grades, including installation of soil amendments and soil fertility testing (where required), apply fertilizer at specified rates.

D. Perennial Grass Seed Bed Preparation:
1. Straw mulch should be used for stubble punched mulch on areas where work is not completed until mid-October.
2. Leave surfaces (seedbed) hard to discourage weed growth and erosion.
a. Ground should be undisturbed and uncultivated.
3. Apply Glyphosate and/or Banvel as appropriate to terminate all weeds, thistle and undesirable growths 5 days prior to seeding or 2, 4-D if only broadleaf control is required.

E. Preparation for Seeding:
   1. Loosen surface to minimum depth of 4 IN.
      a. Remove stones over 1 IN in any dimension and sticks, roots, rubbish, and other extraneous matter.
   2. Prior to applying fertilizer, loosen areas to be seeded with a double disc or other suitable device if the soil has become hard or compacted.
      a. Correct any surface irregularities in order to prevent pocket or low areas which will allow water to stand.
   3. Distribute fertilizer uniformly over areas to be seeded.
   4. Incorporate fertilizer into soil to a depth of at least 2 IN by disking, harrowing, or other approved methods.
      a. Remove stones or other substances from surface which will interfere with turf development or subsequent mowing operations.
   5. Restore areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.2 INSTALLATION

A. General:
   1. Do not use seed which is wet, moldy or otherwise damaged.
   2. Perform seeding work from March 1 to May 15 for spring planting, and August 1 to October 15 for fall planting, unless otherwise approved by Owner.
   3. Employ satisfactory methods of sowing using mechanical power-driven drills or seeders as specified.
   4. Stop work when work extends beyond most favorable planting season for species designated, or when satisfactory results cannot be obtained because of drought, high winds, excessive moisture or other factors.
      a. Resume work only when favorable conditions develop.
   5. Lightly rake seed into soil followed by light rolling or cultipacking.
   6. Immediately protect cover crop against erosion by mulching all areas.
      a. Spread mulch in continuous blanket using 1-1/2 tons per acre, to a depth of 4 or 5 straws, not including areas where turf reinforcements are to be installed.
      b. Install turf reinforcements per Specifications.
      c. Protect seeded slopes against erosion with erosion netting or other methods approved by Engineer.
   7. Protect seeded areas against traffic or other use by erecting barricades and placing warning signs.
   8. Immediately following spreading mulch, anchor mulch using a rolling coulter or a wheatland land packer having wheels with V-shaped edges to force mulch into soil surface.

B. Perennial Grass Seeding:
   1. Equipment:
      a. Seed all perennial grasses with a grass drill or approved equal.
         1) Use a grain or grass drill with disk openers, 8 IN drill row spacing, heavy rubber packing wheels that track directly over drill rows, even flow of seed from the seed box to the soil, and depth bands on disk openers or adjustable frame to control planting depth.
      b. Use a grass seed box and calibrate for 1/2 of the PLS per acre and cross drill.
         1) Provide frequent agitation and mixing in the seed box, every 2 to 4 acres, to prevent heavy seeds from sifting to the bottom of the box.
   2. Seeding method:
      a. Cross drill by seeding one-half the total rate in two directions, NE-SW, and diagonal to the first direction.
      b. Seed grasses at rates specified.
   3. Planting depth:
      a. Use depth bands on disk openers or adjust drill frame to seed at planting depth recommended by seed supplier, unless otherwise approved.

C. Top of Slope (5%):
   1. Planting seasons:
      a. August 1 to August 15 or October 15 to November 15.
   2. Equipment:
      a. Use a grain or grass drill with disk openers, 8 IN drill row spacing, heavy rubber packing wheels that track directly over drill rows, even flow of seed from the seed box to the soil, and depth bands on disk openers or adjustable frame to control planting depth.
   3. Planting depth: 3/4 to 1-1/2 IN depth.
   4. Seeding method:
      a. Seed one-half the total rate in two directions, NE-SW and diagonal to the first direction.
      b. Seed at rates specified.
   5. Provide supplemental watering after installation as appropriate for planting conditions.

D. Sideslope (Greater than 5%):
   1. Planting seasons:
      a. March 15 to May 1 or October 15 to November 15.
   2. Equipment:
      a. Use a grain or grass drill with disk openers, 8 IN drill row spacing, heavy rubber packing wheels that track directly over drill rows, even flow of seed from the seed box to the soil, and depth bands on disk openers or adjustable frame to control planting depth.
   3. Planting depth: 3/4 to 1-1/2 IN depth.
   4. Seeding method:
      a. Seed one-half the total rate in two directions, NE-SW and diagonal to the first direction.
      b. Seed at rates specified.
   5. Provide supplemental watering after installation as appropriate for planting conditions.

3.3 MAINTENANCE AND REPLACEMENT

A. General:
   1. Begin maintenance of planted areas immediately after each portion is planted and continue until final acceptance or for a specific time period as stated below, whichever is the longer.
   2. Provide and maintain temporary piping, hoses, and watering equipment as required to convey water from water sources and to keep planted areas uniformly moist as required for proper growth.
   3. Protection of new materials:
      a. Provide barricades, coverings or other types of protection necessary to prevent damage to existing improvements indicated to remain.
      b. Repair and pay for all damaged items.
   4. Replace unacceptable materials with materials and methods identical to the original specifications unless otherwise approved by the Engineer.

B. Seeded Lawns:
   1. Maintain seeded lawns: 90 days, minimum, after installation and any subsequent repairs.
   2. Maintenance period begins at completion of planting, completion of repairs, or installation.
   3. Engineer will review planting area after installation for initial acceptance.
   4. Maintain planted areas by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, and replanting as required to establish a smooth, uniform planting area, free of weeds and eroded or bare areas.
   5. Lay out temporary watering/irrigation system and arrange watering schedule to avoid walking over muddy and newly seeded areas.
      a. Use equipment and water to prevent puddling and water erosion and displacement of seed or mulch.
   6. Mow grassed/planted areas as soon as there is enough top growth to cut with mower set at recommended height for principal species planted.
      a. Repeat mowing as required to maintain height.

b. Do not delay mowing until grass blades bend over and become matted.
c. Do not mow when grass is wet.
d. Time initial and subsequent mowings as required to maintain a height of 1-1/2 to 2 IN.
e. Do not mow lower than 1-1/2 IN.

7. Remulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose.
   a. Anchor as required to prevent displacement.
8. Unacceptable plantings are those areas that do not meet the quality of the specified material, produce the specified results, or were not installed to the specified methods.
9. Replant bare areas using same materials specified.
10. Engineer will review final acceptability of installed areas at end of maintenance period.
11. Maintain repaired areas until remainder of maintenance period or approved by Engineer, whichever is the longer period.

C. Warranty:
   1. Provide Warranty of product and workmanship for one year following Substantial Completion.
      a. Unacceptable plantings are those areas that do not meet the quality of the specified material, produce the specified results, or were not installed to the specified methods.
      b. Replant bare areas using same materials specified.
      c. Engineer will review final acceptability of installed areas at end of Warranty period.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

DIVISION 33

UTILITIES

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 33 34 61
HIGH-DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE LINER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Furnishing, installation, quality control, and testing of a HDPE geomembrane liner.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 01 71 24 - Geomembrane Electrostatic Leak Location Survey.
   4. Section 31 23 00 - Earthwork.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Standards for Testing and Materials (ASTM):
      a. D413, Standard Test Method for Rubber Property Adhesion to Flexible Substrate.
      b. D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
      c. D882, Standard Test Methods for Tensile Properties of Thin Plastic Sheeting.
      d. D1004, Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
      e. D1505, Standard Test Method for Density of Plastics by the Density-Gradient Technique.
      f. D3895, Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Colorimetry.
      g. D4218, Standard Test method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
      h. D4437, Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
      i. D4833, Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.
      j. D4873, Identification, Storage and Handling of Geosynthetic Rolls.
      k. D5321, Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
      l. D5397, Standard Test Method for Evaluation of Stress Crack resistance of Polyolefin Geomembranes Using notched Constant Tensile load Test.
      m. D5596, Standard Test method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
      n. D5641, Geomembrane Seam Evaluation by Vacuum Chamber.
      o. D5721, Standard Practice for Air-Oven Aging of Polyolefin Geomembranes.
      p. D5820, Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.
      q. D5885, Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimitry.
      r. D5994, Standard Test Method for Measuring Core Thickness of Textured Geomembranes.
      s. D6392, Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
      t. D6693, Standard Test Method for Determining Tensile Properties of nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.

u. D7238, Standard Test method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus.
v. D7466, Standard Test Method for Measuring Asperity Height of Textured Geomembranes.

2. Geosynthetic Research Institute (GRI):
a. GM6, Pressurized Air Channel Test for Dual Sound Geomembranes.
b. GM10, The Stress Crack Resistance of HDPE Geomembrane Sheet.
c. GM11, Accelerated Weathering of Geomembranes Using a Fluorescent UVA Device.
d. GM12, Asperity Measurement of Textured Geomembranes Using a Depth Gage.
e. GM13, Test Properties, Testing Frequency and Recommended Warrant for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes.
f. GM14, Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using the Method of Attributes.
g. GM20, Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using Control Charts.

B. Quality Assurance Testing by Owner:
1. The Owner or Engineer's Representative will conduct independent testing to support construction quality assurance program and to provide documentation of such to appropriate regulatory agencies.
a. Facilitate and provide opportunities as required.
2. Unless specifically superseded by these Contract Documents or approved plans submitted by the Contractor, the geosynthetic materials shall be manufactured, stored, placed, seamed, tested and protected as described in EPA 600/R-93/182 and EPA 530/SW-91/051.
a. This specifically includes:
1) Material Composition.
2) Manufacturing.
3) Handling and Packaging.
4) Shipment.
5) Storage (Manufacturer and Site).
6) Placement:
a) Seaming and Joining.
b) Destructive and Nondestructive Testing
c) Protection, Backfilling, and Covering.
7) Conformance Testing.
8) Anchoring and Anchor Trenches.
9) Access Roads/Ramps.

C. Qualifications:
1. Manufacturer: Demonstrate five (5) years continuous experience with a minimum of 10,000,000 SQFT of HDPE geomembranes.
2. Installer:
a. Demonstrate three (3) years continuous experience with a minimum 10,000,000 SQFT of HDPE geomembranes in solid waste landfills.
b. Trained and certified by at least one of the named manufacturer's in this Specification (not necessarily the Manufacturer supplying materials for this Project).
3. Installer Supervisor/Foreman:
a. Demonstrate three (3) years continuous experience working in a similar capacity during installation of a minimum of 10,000,000 SQFT of 60-mil HDPE geomembrane.
4. Independent Testing Laboratory shall demonstrate three (3) years of continuous experience in similar geosynthetic materials testing.
a. The Independent Testing Laboratory shall be employed by the Contractor, not the Installer.
b. Certified by the Geosynthetic Research Institute (GRI).
5. Installation Personnel:

a. For welding, seaming, and testing personnel shall have previously completed 1,000,000 SQFT of 60 MIL HDPE performing the same function.

D. Certifications:
1. Certifications are required for various aspects of the project related to the HDPE geomembrane liner system construction.
a. Unless alternately approved, the certificates provided at the end of this Section shall be used and no alterations, additions, deletions, or exception shall be made to the specified language.

1.3 DEFINITIONS

A. Manufacturer:
1. Manufacturer producing geomembrane sheets from resin and additives, and/or fabricating special items from HDPE materials.

B. Installer:
1. Party responsible for field handling, transporting, storage, deployment, seaming, and field testing.
a. Certified by the Manufacturer to install the Manufacturer's geomembrane.
2. When reference is made to Installer as a person, the Installer is the crew foreman actually performing or supervising the hands-on work in the field.

C. Independent Testing Laboratory:
1. The firm hired by the Contractor to perform destructive testing of the HDPE geomembrane.
2. Firm shall be acceptable to Engineer and the Owner.

1.4 SUBMITTALS

A. Shop Drawings:
1. See Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
2. Submit for Engineer's approval Shop Drawings, including:
a. Manufacturer's certification that raw materials and sheet materials comply with required material properties.
1) No faxed copies.
b. Manufacturer/Fabricator and Installer quality control manuals.
1) Identify all field procedures and installation/construction quality assurance methods.
2) Procedures shall be no less stringent than these Specifications, unless otherwise approved by Engineer.
3) Manufacturer's requirements and procedures will govern in the event of a conflict with Fabricator or Installers quality control manuals.
c. Provide certification of Installer Supervision/Foreman and Installer's training (unless Installer is certified by other acceptable manufacturer list herein), experience and methods for welding, seaming, jointing and inspecting geosynthetic materials installations in compliance with Manufacturer's standards and with Quality Assurance requirements of this Specification (Article 1.2).
d. Provide qualifications and experience of key installation personnel involved in installation, seaming, testing and inspection of the geosynthetic materials.
e. HDPE Geomembrane layout plan with proposed size, type, number, position and sequencing of liner panels and showing the location and direction of all field or factory seams.
1) Proposed details for connecting the geosynthetic materials to appurtenances.
2) Proposed methods of welding, seaming or jointing geosynthetic materials.
3) Proposed method and sequencing for placement of drainage layer on top of the HDPE geomembrane liner.

4) Proposed method of testing HDPE geomembrane and other geosynthetic materials, joints and connections at appurtenances for continuity.
5) Location and configuration of haul roads and access points.

f. Direct-Shear Interface friction test results.

B. Miscellaneous Submittals:
1. Test results:
a. Resin tests, tests of sheet material and factory seam tests at frequency specified in respective quality control manuals.
1) Results shall include or bracket the rolls delivered for use in the Work.
b. Daily test seam results.
c. Daily results of production seam testing.
d. Destructive seam test results by Installer and Independent Testing Laboratory.
2. Warranties as described below.
3. Submit written certifications that:
a. Utilize certification forms from this Section unless alternately approved.
1) Make appropriate number of copies, as required.
2) Complete and sign appropriate form daily.
b. The HDPE geomembrane material delivered to site meets the requirements of this Specification.
c. The HDPE geomembrane were received and accepted in undamaged condition from shipper.
d. The subgrade has been properly prepared and acceptable for the placement of the HDPE geomembrane.
e. The HDPE geomembrane liner was installed in accordance with this Specification and with approved Shop Drawings.
f. The HDPE geomembrane joints were inspected, tested for strength and continuity, and passed all inspections and tests.
1) All test and inspection data shall be incorporated into this certification.
g. The geotextiles and drainage layer on top of the HDPE geomembrane liner were placed properly and carefully.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle and store HDPE geomembrane in accordance with the manufacturer's recommendations and ASTM D4873.

B. Label each roll with the manufacturers name, type, lot number, roll number, and roll dimensions (length, width, gross weight).
1. Repair or replace HDPE geomembrane or plastic wrapping damaged as a result of storage or handling, as directed.
2. Do not expose HDPE geomembrane to temperatures in excess of 71 DEGC (160 DEGF) and below 0 DEGC (32 DEGF).

C. Do not use hooks, tongs or other sharp instruments to handle the HDPE geomembrane.
1. Do not lift rolls by use of cables or chains in contact with the HDPE geomembrane.
2. Do not drag HDPE geomembrane along the ground.

1.6 WARRANTIES

A. Written warranties addressing HDPE geomembrane material and installation workmanship shall be furnished by the Contractor and shall be made to the Owner.

B. Submit warranties prior to shipment.

C. Suitability of geosynthetic liner system shall be subject to Owner approval of warranty.
1. The Manufacturer's warranty shall state that the furnished material meets all requirements of the Contract Drawings and Specifications and that under local atmospheric conditions the sheet material is warranted for 20 years, prorated.

2. The Installer's warranty shall state that the materials were properly installed, properly (field and factory) welded, seamed and jointed and will not fail within two years of the installation under similar conditions.
    a. Warranty shall not be prorated.

D. Warranties shall provide for complete repair/replacement at no additional cost to the Owner for the warranty period.

1.7 PROJECT/SITE CONDITIONS

A. When the weather is of such a nature as to endanger the integrity and quality of the installation whether this is due to rain, high winds, cold temperatures, or other weather elements, stop the installation until the weather conditions are satisfactory.

B. Ensure that adequate dust control methods are in effect to prevent the unnecessary accumulation of dust and dirt on surfaces which hamper efficient field seaming or performance.

C. Maintain surface water drainage diversions around the work area and provide for the disposal of water which may collect in the work area directly from precipitation falling within the area or from inadequate diversion structures or practices.

D. Coordinate with the installation of the leachate collection system, and 12-mil geomembrane (rain cover) to the extent applicable.
    1. See additional requirements on Drawings.

E. Vehicles, other than those specifically approved, will not be allowed to drive directly on the HDPE membrane liner.
    1. The Owner and Engineer’s approval will be based on the following considerations:
        a. Only low ground pressure, all-terrain vehicles (ATV) will be considered.
        b. Demonstrate typical operations, including stopping and turning on the geomembrane.
        c. Inspect tires for trapped stones before each time the ATV enters the geomembrane.
        d. Do not refuel vehicles on the geomembrane.
        e. Failure to comply with any of these procedures will result in permanent loss of any approval granted to use such equipment.

F. When damage is suspected, uncover area, repair damage if required, and recover area at no cost to the Owner.
    1. Suspect areas may be identified by the Owner or Engineer.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents the following Manufacturer's are acceptable:
    1. HDPE Geomembrane liners:
        a. GSE Lining Technology, Inc., 19103 Gundle Rd., Houston, Texas 77073.
        b. Agru America, Inc., 700 Rockmead, Suite 150, Kingwood, Texas 77339.
        c. Poly-Flex, Inc., 2000 West Marshall Drive, Grand Prairie, Texas 75051.
        d. Solmax International, Inc. 2801 Marie-Victorin Blvd. Varennes, Quebec Canada.

B. Submit request for substitution in accordance with Specification Section 01 25 13.

2.2 MATERIALS

A. HDPE Geomembrane Liner:
    1. HDPE geomembrane, textured both sides: Thickness 60 MILS.
    2. Consist of unreinforced polyethylene.
        a. Manufactured from virgin, first quality resin designed and formulated specifically for liquid containment in hydraulic structures.

b. Reclaimed polymer shall not be added to the resin; except use of polymer recycled during the manufacturing process shall be allowed provided that recycled polymer shall be clean and shall not exceed 2% by weight.
c. Add no fillers or post-consumer resin prior to or during manufacture of the HDPE geomembrane.

3. Manufactured to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter.
   a. Any such defects shall be cause for rejection of the material.
   b. Minor defects may be repaired in accordance with Manufacturer's recommendations if approved by the Engineer.
4. Manufactured as seamless rolls or as prefabricated panels.
   a. Minimum width: 22 FT as delivered to the site.
   b. All factory seams shall be inspected and tested for strength and continuity prior to delivery to the site.
5. Specifications:
   a. HDPE geomembrane shall possess properties which meet or exceed the following minimum GRI GM13 requirements for textured geomembrane:

PROPERTY	TEST METHOD	VALUE
Thickness (min average)		57-mils (Nominal 60-mil)
- lowest indiv. For 8 out of 10 values - lowest indiv. For any of the 10 values	D5994	-10% -15%
Asperity Height (min. ave.)	D7466	16 MIL
Density (min. ave.)	D1505/D792	0.940 g/cc
Tensile Properties (min. ave.) (1)	D6693 Type IV	
- yield stress - break stress - yield elongation - break elongation		126 LB/IN 90 LB/IN 12% 100%
Tear Resistance (min. ave.)	D1004	42 LB
Puncture Resistance (min. ave.)	D4833	90 LB
Stress Crack Resistance (2)	D5397 (App.)	500 HR
Carbon Black Content (range)	D4218 (3)	2.0-3.0%
Carbon Black Dispersion	D5596	Note (4)
Oxidative Induction time (OIT) (min. ave.)		
(a) Standard OIT or	D3895	100 min
(b) High Pressure OIT	D5885	400 min
Oven Aging at 85 DEGC (5), (6)	D5721	
(a) Standard OIT (min. ave.) or	D3895	55%
(b) High Pressure OIT (min. ave.) % retained after 90 days	D5885	80%

PROPERTY	TEST METHOD	VALUE
UV Resistance [7]	D7238	
(a) High Pressure OIT (min. Ave.) % retained after 1600 HRS [8]	D5885	50%

1) Machine direction (MD) and cross machine direction (XMD) average values shall be on the basis of 5 test specimens each direction:
   a) Yield elongation is calculated using a gage length of 1.3 IN.
   b) Break elongation is calculated using a gage length of 2.0 IN.
2) The SP-NCTL test shall be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials.
   a) The yield stress used to calculate the applied load for the SP-NCTL test shall be the manufacturer's mean value via MQC testing.
3) Other methods such as D4218 (muffle furnace) or microwave methods are acceptable.
4) Carbon black dispersion for 10 different views:
   a) Minimum 8 of 10 IN Categories 1 or 2.
   b) All 10 IN Categories 1, 2, or 3.
5) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.
6) Evaluate supplies at 30 and 60 days to compare with the 90 day response.
7) The condition of the test should be 20 HR UV cycle at 75 DEGC followed by 4 HR condensation at 60 DEGC.
8) UV resistance is based on percent retained valve regardless of the original HP-OIT value.

6. Interface Friction Tests:
   a. Interface friction of the HDPE geomembrane shall be tested in accordance with ASTM D5321 and meet the following typical values:

INTERFACE	MINIMUM FRICTION DEGREE
HDPE Geomembrane to recompacted clay liner (bottom).	24

   b. One set of three (3) direct-shear interface friction tests shall be conducted on each of the interfaces listed above.
      1) Normal stresses of 500 PSF, 1000 PSF, and 1500 PSF shall be used.
      2) The strain rate shall be 0.04 IN/min with a minimum consolidated time of 1 HR.
      3) The recompacted clay liner material shall be compacted within the moisture-density range specified in Section 31 23 00.
      4) All interfaces shall be tested in a moist condition.
      5) All geosynthetic materials shall be oriented such that the shear force is parallel to the downslope orientation of these components in the field.
   c. The tests shall be conducted in accordance with ASTM D5321, Procedure B for the soil to geosynthetic interface.
      1) Hydration/Consolidation Time: 48 HRS.
      2) Load (Strain) Rate: 0.04 IN/minute.

2.3 EQUIPMENT AND ACCESSORIES

A. Welding and Seaming Equipment:
   1. Equipped with gages showing temperatures at the nozzle (extrusion welder) or at the wedge (wedge welder).

2. Maintained in adequate numbers to avoid delaying work.
3. Supplied by a power source capable of providing constant voltage under a combined-line load.
4. Do not place electric generator directly on the HDPE geomembrane.

B. Field Tensiometer:
1. Provide a tensiometer for on-site shear and peel testing of HDPE geomembrane seams.
   a. Tensiometer shall be in good working order.
   b. Built to ASTM Specifications.
   c. Accompanied by evidence of calibration of equipment and gages within the past six months.
2. Tension meter:
   a. Motor driven.
   b. Jaws capable of traveling a measure rate of 2 IN per minute.
   c. Equipped with a gauge that measures the force in unit pounds exerted between the jaws.
   d. Digital readout:
      1) Analog dial type gauges will be accepted provided they meet the criteria in Part 2.3.F of this Section, and are equipped to display peak values.

C. Punch Press:
1. Provide a punch press for the onsite preparation of specimens for testing.
2. Capable of cutting specimens in accordance with ASTM D4437.

D. Vacuum Box:
1. Provide a vacuum box for onsite testing of HDPE geomembrane seams in accordance with ASTM D5641.

E. Equipment necessary to perform "Pressurized Air Channel Evaluation of Dual Seamed Geomembranes" in accordance with ASTM D5820.

F. Gages:
1. Calibrated within past six months.
2. Specified test values reading near mid-range of the gage scale.

2.4 MANUFACTURE AND FABRICATION

A. Produce geomembrane sheet which complies with this Specification.

B. Provide resin and additive quality control.

C. Fabricated Specials:
1. Subject to same level of manufacturer's quality control.
2. Fabricated from project rolls.
   a. Provide traceability of resin and roll stock.

PART 3 - EXECUTION

3.1 GEOSYNTHETIC LINER SYSTEM

A. Geomembrane Subgrade:
1. Protect subgrade at all times from damage until such time as the placement of HDPE geomembrane liner and other components of the geosynthetic liner system are complete.
2. The subgrade shall be prepared in a manner consistent with proper subgrade preparation techniques for the installation of HDPE Geomembrane.
   a. The subgrade shall be properly compacted so as not to settle and cause excessive strains in the HDPE Geomembrane or other synthetic liner materials.
   b. Prior to installation, ensure a surface free of debris, roots, or angular stones larger than 1/2 IN.
   c. In addition, ensure that the subgrade has been rolled to provide a uniform surface.

d. During installation, ensure that rutting or raveling is not caused by installation equipment or weathering.

3. See Section 31 23 00.

B. Anchorages:
1. Geosynthetic materials placed on sideslopes shall be anchored as detailed on the Drawings.
2. Excavation, backfill, grading, and compaction shall be in accordance with Section 31 23 00.

C. HDPE Geomembrane:
1. General:
a. Installer of HDPE geomembranes is responsible for handling, fitting, welding, seaming, jointing and field testing the geomembranes.
b. These responsibilities include but are not limited to:
1) Acceptance (in writing) of the geomembrane materials from the transporter.
2) Acceptance (in writing) of the soil subgrade which will serve as a base for the HDPE geomembrane.
a) This acceptance shall precede installation of the HDPE geomembrane.
b) Shall state that the Installer has inspected the surface, and reviewed the Specifications for material and placement, and finds all conditions acceptable for placement of HDPE geomembrane liners.
c) Shall explicitly state any and all exceptions to acceptance.
3) Handling, welding, seaming, jointing, field testing and repair of HDPE geomembranes in compliance with this Specification and with written procedures manuals prepared by the Manufacturer or Fabricator.
a) HDPE Geomembrane shall not be placed upon frozen foundation, standing water or other conditions which will result in deterioration of the foundation.
b) HDPE Geomembrane liner materials shall be laid out according to plans previously approved by the Engineer.
c) Adjacent rolls of HDPE geomembrane shall overlap a minimum of 3 IN, provided that greater overlap may be required to allow seaming in accordance with the Manufacturer's instructions.
4) Repair or replacement of defects in the geosynthetic materials as required by the Engineer.
2. Panel deployment:
a. Only those panel/sheets that can be seamed in 1 day shall be deployed.
b. Place panels with minimal handling.
1) Orient sheets to eliminate or minimize number of horizontal seams on side slopes.
2) Protect panels from tear, puncture or abrasion.
3) Minimize seams in leachate collection trenches.
4) Do not drag sheets for deployment.
c. Equipment used to deploy the geomembrane shall not rut the recompacted clay liner.
1) A rut is defined as a 0.1 FT depression over a 10 FT straight-edged length.
d. Minimize foot traffic.
1) Do not allow personnel access to wet or slippery liners without adequate safety precautions.
e. Ballast with sandbags to prevent wind uplift as recommended by Manufacturer and based on local climatic conditions.
1) Remove and replace all wind damaged panels at no additional cost to Owner.
2) If wind causes panels to be displaced, displaced panel may not be reused.
3) Do not throw or slide sandbags across geomembrane.
f. Install HDPE geomembrane in stress free, tension free and relaxed condition.
1) Installation shall be graded and sequenced to prevent stormwater from running below the liner.
2) Account for temperature and weather-related impacts when deploying and covering.
3) Stretching to fit and folding are not permitted.

g. Do not allow HDPE geomembrane to bubble, fold, or create ripples as a result of geotextile or drainage layer placement.
    1) Except as noted on Contract Drawings no folds in HDPE geomembrane will be allowed.
h. Any panel exhibiting stretching caused by placement, covering techniques, or wind shall be removed and may not be incorporated in the final construction.
i. Provide exposed ends until completion of electrostatic leak location testing by Owner under Section 01 71 24.
j. No vehicles will be allowed on the liner.

3. Field seaming:
    a. Perform in accordance with seaming recommendations furnished by the geomembrane Manufacturer.
    b. Surfaces to be seamed shall be clean and dry at the time of seaming.
        1) Precipitation and ponding of water on the HDPE geomembrane shall cause termination of seaming operations.
        2) Do not seam HDPE geomembrane when ambient temperatures are below 41 DEGF or above 104 DEGF, without written consent of HDPE geomembrane Manufacturer and Engineer.
    c. Seam sheets continuously without fishmouths or breaks in the seam.
        1) Where fishmouths are unavoidable, slit sheet to a point such that the sheet lies flat and with no remaining wrinkle.
        2) The two (2) edges of the slit shall be seamed together provided that the overlap for this seam shall be a minimum of 6 IN.
        3) Areas of the slit which do not achieve an overlap of 6 IN, including the terminus of the slit, shall be provided with a patch as discussed below.
    d. Seam all HDPE geomembranes with thermal fusion methods as recommended by the HDPE geomembrane manufacturer.
        1) HDPE geomembrane seaming shall be double wedge weld unless otherwise approved or prohibited by construction.
    e. Manufacturer's seaming instructions shall specifically address subgrade preparation, seaming materials, temporary and permanent jointing, seaming temperatures including temperatures for seaming materials, seam finishing and curing.
    f. A copy of Manufacturer's seaming instructions shall be available on site at all times and shall not be deviated from without written approval of the Manufacturer and Engineer.
    g. All panels/sheets should be overlapped a minimum of 3 IN.
        1) If horizontal seams are required on side slopes, lap the upper panel over the lower panel.
    h. Do not conduct seaming in the presence of standing water and/or soft subgrades.
        1) Clean the seamed area of dust, dirt and foreign material prior to and during the seaming operation.
    i. Extend seaming to the outside edge of panels/sheets to be placed in anchor and/or drainage trenches.
    j. Tack welds shall conform with Manufacturer's seaming techniques and shall not damage underlying membrane.

4. Patching:
    a. Repair defects in and damage to HDPE geomembrane sheets by seaming a patch over the defect.
        1) Use an undamaged piece of HDPE geomembrane cut to provide a minimum of 6 IN of overlap in all directions from the defect.
        2) Round the corners on all patches.
        3) No bead or spot patching will be accepted.
        4) Replace torn or permanently twisted HDPE geomembrane at no expense to the Owner.
    b. Test all patch seams using one of the following nondestructive tests: vacuum tests; spark tests; or ultrasonic tests.

1) Test patch seams destructively as directed by the Engineer.
2) This destructive testing may be accomplished using demonstration seams performed adjacent to the liner installation.

3.2 FIELD QUALITY CONTROL

A. Trial Seam Testing:
1. Trial Seam Testing shall be conducted in accordance with the CQA Plan and the following requirements:
   a. Trial seams shall be made each half-day prior to production seaming, or seaming is interrupted for more than 10 minutes, and at other times at the discretion of the Installer and Owner's Quality Assurance Consultant.
      1) The location of trial seam shall be in an area proposed for the day's production seaming.
      2) Equipment, methods and personnel shall be the same as proposed for the day's seaming.
   b. Samples shall be cut and tested in accordance with ASTM D6392 and tested in accordance with ASTM D413 and ASTM D882.
      1) To be acceptable, five (5) of five (5) replicate test specimens must meet specified seam strength requirements and failures shall be Film Tear Bond.
      2) If the field tests fail to meet these requirements, the entire operation shall be repeated.
      3) If the additional test seams fail, the seaming apparatus or seamer shall not be accepted or used for seaming until the deficiencies are corrected and two consecutive successful test seams are achieved.

B. Non-Destructive Seam Testing:
1. All field seams shall be non-destructively tested over their full length.
   a. Seam testing shall be performed as the seaming work progresses, not at the completion of field seaming.
   b. All testing shall be documented.
   c. Any seams which fail shall be repaired and documented.
2. Non-destructively test all field seams continuously using one of the following nondestructive seam tests: Vacuum box; ultrasonic tests; spark tests; and pressurized air channel test.

C. Destructive Seam Testing:
1. Shall only be utilized (cut out of seams).
2. Frequency of samples:
   a. Not exceeding one (1) test per 500 LF of seamed length, per welding machine.
   b. Minimum of one (1) on each long side of each panel, unless otherwise approved by Owner's Quality Assurance Consultant or Engineer.
   c. Other samples as Engineer determines appropriate, shall be obtained at locations specified by the Engineer.
   d. The sample frequency may be increased or decreased, based on the Engineer's review of the Work, installer's quality control procedures and test results.
3. Sample locations shall not be identified prior to seaming.
   a. The samples shall be a minimum of 12 IN wide by 48 IN long with the seam centered lengthwise.
   b. Cut each sample into three equal pieces with one piece retained by the Installer, one piece given to an Independent Testing Laboratory, and the remaining piece given to the Engineer for quality assurance testing and/or permanent record.
   c. Each sample shall be numbered and recorded on the final panel layout record Drawing, and cross-referenced to a field log which identifies:
      1) Panel/sheet number.
      2) Seam number.
      3) Top sheet.

4) Date and time cut.
5) Ambient temperature.
6) Seaming unit designation.
7) Name of seamer.
8) Seaming apparatus temperature and pressures (where applicable).

4. Cut a minimum of six (6) 1 IN wide replicate specimens from the Installer's sample.
   a. Test a minimum of three (3) specimens for shear strength and three (3) for peel adhesion using an approved field quantitative tensiometer.
   b. Jaw separation speed shall be 2 IN per minute.
   c. To be acceptable, all replicate test specimens must meet the specified seam strength requirements and fail as Film Tear Bond.
5. If the field tests pass, five (5) specimens shall be tested at the Independent Testing Laboratory for shear strength and five (5) for peel adhesion in accordance with ASTM D6392.
   a. Test both sides of a dual-track weld.
   b. To be acceptable, four (4) out of five (5) replicate test specimens must meet the specified seam strength requirements and fail as Film Tear Bond.
   c. If the field or laboratory tests fail, the seam shall be repaired in accordance with the Manufacturer's Quality Control manual.
   d. In addition, all destructive seam sample holes shall be repaired the same day as cut.
   e. Certified test results on all field seams shall be submitted to and approved by the Engineer prior to acceptance of the seam.
6. Ten percent of all repaired areas shall be destructively tested by use of demonstration testing.
   a. All repaired areas shall be non-destructively tested.
7. The Engineer may separately conduct destructive testing for quality assurance.
   a. If samples tested by Engineer fail, based on above criteria, seam will be classified as failed.
8. A map showing the locations, number, date and type of all patches shall be prepared and provided to the Owner.
   a. Through field logs or on drawings also include all information required by Part 3.2.C of this Specification Section.

D. The Minimum Required Seam Strengths:
   1. HDPE geomembrane:

MODE	TEST METHOD	MINIMUM EXTRUSION VALUE (LBS/IN)	FUSION
Peel	ASTM D6392	78	91
Shear	ASTM D6392	120	120

3.3 GEOSYNTHETIC LINER SYSTEM ACCEPTANCE

A. Contractor shall retain all ownership and responsibility for the geosynthetic liner system until final acceptance by the Owner.
   1. The Owner will accept the geosynthetic liner system installation when the installation is finished, electrical leak test survey is complete, repairs are completed, and all required warranties, test results, and documentation from the Contractor, Manufacturer, and Installer has been received and approved, and verification of the adequacy of all field seams and repairs, including associated testing, is complete.

B. Submittal of such documentation shall be a condition precedent to Substantial Completion.

3.4 SCHEDULE OF CERTIFICATIONS

A. The schedule of required certifications and signing parties follows the end of this Section.

B. The certificates following the end of this Section shall be completed and signed by the required parties, and the original certificates delivered to the Engineer's Representative as a part of the completion of that particular phase of the geosynthetic liner system installation.

END OF SECTION

METRO WASTE AUTHORITY
Metro Park West Landfill
P-64 Cell D Liner

	CERTIFICATE	**SIGNATURES REQUIRED**
1.	Certification of Raw and Fabricated Material	Manufacturer Fabricator
2.	Certification of Material Acceptance from Shipper	Installer Contractor
3.	Certification of Acceptance of Subgrade	Installer Contractor
4.	Certification of Material Installation	Installer Contractor
5.	Certification of Material Joints	Installer Contractor
6.	Certification of Placement of Adjacent Liner Components	Installer Contractor

METRO WASTE AUTHORITY
Metro Park West Landfill
P-64 Cell D Liner

CERTIFICATION OF RAW AND FABRICATED MATERIAL
(To Accompany Each Shipment) (Circle Material Type)

DATE:_____

MATERIAL DESCRIPTION:_____

_____
(include lot and roll/panel numbers)

WE THE UNDERSIGNED CERTIFY THAT THE RAW MATERIAL AND FINISHED [*HDPE GEOMEMBRANE LINER, GEOTEXTILE, HDPE GEOMEMBRANE RAIN COVER*] FURNISHED FOR THE METRO WASTE AUTHORITY COMPLY WITH SPECIFICATION SECTION [33 34 61, 31 32 19, 31 32 20] FOR Metro Waste Authority Project P-64 Cell D Liner and Leachate System.

_____
MANUFACTURER NAME

_____
MANUFACTURER SIGNATURE (Authorized Representative)

_____
FABRICATOR NAME

_____
FABRICATOR SIGNATURE (Authorized Representative, if different from Manufacturer)

METRO WASTE AUTHORITY
Metro Park West Landfill
P-64 Cell D Liner

CERTIFICATION OF MATERIAL ACCEPTANCE FROM SHIPPER
(Per shipment; each roll or container) (Circle Material Type)

REPORT NO.:_____ DATE: _____

PANEL, ROLL, AND CONTAINER NUMBER REFERENCES_____

_____

WE THE UNDERSIGNED ACCEPT THE [*HDPE GEOMEMBRANE MATERIALS (ROLLS, SHEETS, BLANKETS), GEOTEXTILES*] FROM THE TRANSPORTER. THESE MATERIALS WERE RECEIVED IN UNDAMAGED CONDITION BASED UPON OUR VISUAL INSPECTION.

_____
INSTALLER SIGNATURE

_____
CONTRACTOR SIGNATURE

METRO WASTE AUTHORITY
Metro Park West Landfill
P-64 Cell D Liner

CERTIFICATION OF ACCEPTANCE OF SUBGRADE - Daily Certification
(Circle Material Type)

REPORT NO.:_____ DATE: _____

AREA REFERENCED:_____

_____

LINER PANEL NUMBERS INSTALLED OVER REFERENCED AREA THIS DATE:

_____

WE THE UNDERSIGNED CERTIFY THAT WE HAVE INSPECTED THE ENTIRE SURFACE, AND HAVE REVIEWED THE SPECIFICATION SECTION [33 34 61, 31 32 19, 31 32 20] AND RELATED SHOP DRAWINGS FOR MATERIAL AND PLACEMENT, AND FIND ALL CONDITIONS ACCEPTABLE FOR PLACEMENT OF THE [HDPE GEOMEMBRANE LINER, GEOTEXTILE, HDPE GEOMEMBRANE RAIN COVER].

WE SPECIFICALLY TAKE THE FOLLOWING EXCEPTIONS TO THE ACCEPTANCE OF THE SUBGRADE ON THIS DATE:

_____

_____

_____

(Note: All exceptions shall be approved by MWA or Engineer prior to HDPE Geomembrane Liner, Geotextile, and HDPE Geomembrane Rain Cover deployment)

_____
INSTALLER SIGNATURE

_____
CONTRACTOR SIGNATURE

METRO WASTE AUTHORITY
Metro Park West Landfill
P-64 Cell D Liner

CERTIFICATE OF MATERIAL INSTALLATION - Daily Certification
(Circle Material Type)

REPORT NO.:_____ DATE: _____

AREA REFERENCED:_____

_____

LINER PANEL NUMBERS INSTALLED THIS DATE:_____

_____

_____

WE THE UNDERSIGNED CERTIFY THAT THE [*HDPE GEOMEMBRANE LINER, GEOTEXTILES, HDPE GEOMEMBRANE RAIN COVER*] WAS INSTALLED IN ACCORDANCE WITH THE SPECIFICATION SECTION [33 34 61*, 31 32 19, 31 32 20*] AND WITH APPROVED SHOP DRAWINGS.

_____
INSTALLER SIGNATURE

_____
CONTRACTOR SIGNATURE

METRO WASTE AUTHORITY
Metro Park West Landfill
P-64 Cell D Liner

CERTIFICATION OF MATERIAL JOINTS - Daily Certification Per Test
(As Shop Drawings and as a Compiled Report at the end of Project)
(Circle Material Type)

TEST REPORT NO.:_____ DATE: _____

FIELD LOG NO.:_____

LIST OF ALL DEFICIENCIES AND SUBSEQUENT REPAIRS, COPIES OF ALL FIELD AND FACTORY TESTS AND INSPECTION DATA INCLUDING RECORDS OF ALL NON-DESTRUCTIVE TESTING (Field Logs) AND REPAIRS ARE ATTACHED.

WE THE UNDERSIGNED CERTIFY THAT THE [*HDPE GEOMEMBRANE AND ITS JOINTS WERE INSPECTED AND TESTED FOR STRENGTH AND CONTINUITY, GEOTEXTILE AND HDPE GEOMEMBRANE RAIN COVER SEAMS WERE INSPECTED FOR CONTINUITY*] AND PASSED ALL INSPECTIONS AND TESTS. WHERE FAILING TESTS OR DEFICIENCIES OCCURRED, THE AREA OF FAILURE WAS IDENTIFIED IN ACCORDANCE WITH THE APPROVED QUALITY CONTROL PROGRAM FOR THE PROJECT AND REPAIRED. THE AREAS OF FAILING TESTS, DEFICIENCIES AND THE SUBSEQUENT RETESTS OR TESTS TO DELINEATE THE LIMITS OF FAILURE ARE IDENTIFIED IN THE ATTACHED SEAM TESTS AND INSPECTION DATA.

_____
INSTALLER SIGNATURE

_____
CONTRACTOR SIGNATURE

METRO WASTE AUTHORITY
Metro Park West Landfill
P-64 Cell D Liner

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.:_____ DATE: _____

COMPONENT BEING PLACED:_____

SUBSTRATE:_____

LOCATION:_____

WE THE UNDERSIGNED CERTIFY THAT THE [*GEOTEXTILE, DRAINAGE LAYER, HDPE GEOMEMBRANE RAIN COVER*] ON TOP OF THE [*HDPE GEOMEMBRANE, GEOTEXTILE, DRAINAGE LAYER*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

_____
INSTALLER SIGNATURE

_____
CONTRACTOR SIGNATURE

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 33 40 00
STORM DRAINAGE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Storm drainage pipe.
   2. Inlets and flared end sections.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.
   3. Section 31 23 00 - Earthwork.
   4. Section 31 23 33 - Trenching, Backfilling, and Compacting for Utilities.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Association of State Highway and Transportation Officials (AASHTO):
      a. M36, Corrugated Steel Culverts and Underdrains.
   2. ASTM International (ASTM):
      a. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
      b. F405, Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings.

1.3 SUBMITTALS

A. Shop Drawings:
   1. See Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
   2. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Product data for pipe, fittings, flared end sections.
   3. Certifications and test reports showing compliance with project requirements.
   4. Submit all tests and certifications in a single coordinated submittal.
      a. Partial submittals will not be accepted.
   5. Submit schedules and details for structures and joints.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Corrugated Metal Pipe (CMP):
   1. CMP Drainage Pipe and Culverts:
      a. AASHTO M36, 16 GA.
      b. Jointing:
         1) Connecting bands of same base metal and coating as pipe.
         2) Provide new jointing material for all pipes.
      c. Joint sealer options:
         1) Cold applied asphalt joint compound.
         2) Preformed flexible pipe joint sealing compound.
   2. CMP flared end sections:
      a. Conform to IDOT Specifications.
      b. Jointing: New material; same as pipe.

B. Coupling Bands and Hardware:
   1. Hardware - coupling bands, band fastening devices, connecting bolts, rods, lugs, and angles:
      a. Used with zinc-coated steel pipe.
         1) Galvanized by the hot-dip method.
      b. Used with aluminized steel pipe.
         1) Same material as the pipe except that hot-dip galvanized or cadmium-plated fasteners may be used.
      c. Coupling bands:
         1) Coated similar to that specified for the pipe.
         2) The coupling bands shall be corrugated to match the corrugations of the pipe section ends being connected.
            a) Connecting lugs and rods: Minimum 1/2 IN DIA.

C. Plastic Drainage Pipe and Pipe Fittings – All New Materials.
   1. Drainage Header Pipe:
      a. ADS N-12® ST IB (soil tight) drainage pipe.
      b. Drainage Basin: Nyoplast Inline Drainage Basin.
      c. ADS HDPE soil tight fittings.
   2. Plastic Culverts:
      a. ADS N-12® ST IB (soil tight) drainage pipe.
      b. ADS HDPE soil tight fittings.
      c. Galvanized steel flared end sections.
   3. Corrugated plastic pipe.
      a. Single wall HDPE pipe meeting requirements of ASTM F405.

PART 3 - EXECUTION

3.1 PREPARATION

A. Trenching: Comply with Section 31 23 33.

B. Handling the Pipe: Furnish equipment as necessary to transport in accordance with manufacturer's recommendations; handle and install the pipe without damaging the pipe or coating.

C. Plastic Pipe Fabrication: Follow manufacturer's recommendations.

3.2 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Laying Pipe:
   1. Comply with Section 31 23 33, except as stipulated.
   2. The pipe shall be installed in accordance with the manufacturer's recommendations.
   3. Pipe shall be installed so no reversal of grade between joints results.

C. Field welding of corrugated metal pipe is not permitted.
   1. The pipe sections shall be joined with fabricator-supplied coupling bands meeting the specified joint requirements:
      a. Outlet structures (flared end sections) to have water-tight joints.
   2. The coupling shall be installed as recommended by the fabricator.

D. The pipe shall be firmly and uniformly bedded throughout its full length.

E. The pipe shall be loaded sufficiently during backfilling to prevent displacement from line and grade and to maintain full contact with the bedding during the placement operations.

F. Repair of Damaged Coating on CMP:
   1. Salvaged pipe which exhibits extensive corrosion, pitting or loss of integrity shall not be used.

a. Pipe shall be cleaned and coating repaired where necessary to ensure performance.

2. Any damage to the metallic coating shall be repaired by cleaning the damaged surface area by sand blasting, power disk sanding, or wire brushing.
3. All loose and cracked coating, dirt, and any products of corrosion shall be removed before application of paint.
4. Oil and grease material shall be removed by use of a solvent.
5. The surface shall be clean and dry during the painting period and until the coating has completely dried.
6. Repair damaged galvanized surfaces in accordance with ASTM A780.
7. When the metallic coating is damaged in any individual area larger than 12 SQIN or if more than 0.2 PCT of the total surface area of a single pipe section is damaged, that section of pipe will be rejected.

G. CMP Coupling Bands and Hardware:

1. Coupling bands shall be installed to provide straight alignment of the connecting pipe ends.
   a. The coupling bandwidth shall be nominally 2 FT wide and cover a minimum of eight (8) corrugations.
      1) Nominal 3-1/2 IN lap.
   b. Maximum gap between pipes at connection: 1-1/2 IN.
   c. The bands shall be positioned to overlap adjacent pipe ends equally.
   d. The coupling bands shall be corrugated to match the corrugations of the pipe section ends being connected.
   e. Connecting lugs and rods:
      1) Minimum four (4) Rods; minimum 1/2 IN DIA.
      2) Located in corrugations so as not to interfere with each pipe when tightened.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

DIVISION 40

PROCESS INTERCONNECTIONS

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 40 05 00
PIPE - PLASTIC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. PVC pipe for:
      a. Leachate collection piping and cleanout risers.
   2. HDPE pipe for:
      a. Toe drain collector and appurtenances at the Greene Co. Landfill Improvements area.

B. Related Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. D1784, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
      b. D1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
      c. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
      d. D2239, Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
      e. D2855, Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
      f. D3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
      g. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
      h. F714, Standard Specification for Polyethylene Plastic Pipe Based on Outside Diameter.

B. Coordinate flange dimensions, couplings, and drillings between piping and equipment.

C. Utilize single manufacturer for all PVC or HDPE system components.

1.3 SUBMITTALS

A. See Section 01 33 00:
   1. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's written instructions regarding handling, delivery, storage, jointing, and installation.
      c. Product data on pipe, fittings, PVC joining compound, and other components.

PART 2 - PRODUCTS

2.1 PVC PIPING

A. General:
   1. PVC piping to be Schedule 80.

2. Furnish materials in full compliance with the following material Specifications:
    a. Manufacture pipe, fittings and appurtenances from polyvinyl chloride (PVC) compound which meets the requirements of Type 1, Grade 1 (12454-B) Polyvinyl Chloride as outlined in ASTM D1784 and also in conformance with ASTM D1785.
3. See piping requirements on Drawings.

B. Solid Pipe:
1. Furnish pipe meeting requirements of ASTM D1784.
    1) Unless otherwise noted, pipe may be solvent welded.

C. Perforated/Slotted Pipe:
1. Furnish perforated/slotted pipe meeting requirements of ASTM F480.
2. See Drawings for pipe schedule and slotting/perforation detail.

D. Fittings: Provide ASTM D2467 and ASTM F480 PVC socket type fittings having the same pressure and temperature rating as the pipe.
1. Provide screw type cap where noted.

E. Fernco Coupler: Model 1056-1010, 1055-1010, or approved alternate where required to mate existing and new leachate collection piping.

2.2 HDPE PIPING

A. General:
1. Provide PE 4710 piping with fittings and appurtenances to locations shown on Drawings.
2. ASTM D3350 Cell classification: PE 345434C.
3. Dimension Ratio: 11, 17, see drawings.
4. Sizing: IPS.
5. Pipe Marking: During extrusion production, the HDPE pipe shall be continuously marked in accordance with AWWA C906 with durable printing including the following information:
    a. Nominal size.
    b. Dimension ratio.
    c. Pressure class.
    d. Manufacturer name or trademark and product series.
    e. Standard material code designation (ex: PE 4710).
    f. Plant identification.
    g. Production date.
6. Perforated Pipe
    a. HDPE pipe requiring perforations shall consist of 0.25 IN diameter holes along 2 rows, each 60 DEG from bottom-center of pipe, 4 IN center-to-center, rotated 45 degrees. The Contractor may submit alternate patterns or spacings that provide equivalent flow and function for Engineer's review.
    b. See Drawings for pipe schedule and slotting/perforation detail.
7. Leachate Solid Pipe:
    a. Furnish pipe meeting requirements of ASTM D1784.

B. Fittings:
1. AWA C906.
2. SDR: appropriate for adjacent piping.
3. 4 to 36 IN: ASTM D3261.
4. Field fabricated fittings are not allowed.
5. Shop fabricated and tested fittings are acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Clean each pipe length thoroughly and inspect for compliance with Specifications.
   1. Remove all grindings.

B. Provide, install, and connect pipe and fittings at locations shown on Contract Drawings and according to manufacturer's directions.

C. Uniformity:
   1. Ensure that piping, fittings, and solvent cements, and welded equipment are integrated components for finished systems.

D. Comply with ASTM D2321.
   1. Solvent weld PVC pipe and fittings, where allowed, in accordance with ASTM D2855.
      a. Solvent welding PVC pipe is acceptable within the leachate collection system.
   2. Conduct fusion or extrusion welding of HDPE pipe in accordance with manufacturer's recommendations and this Section.

E. Install at depths and alignments shown on the Drawings. Ensure proper alignment.
   1. Install gravity piping systems in accordance with ASTM D2321 and manufacturer's recommendations.
   2. Install pressure piping systems in accordance with ASTM D2774 and manufacturer's recommendations.

F. Slope to drain all piping and connections.

G. Laying Pipe in Trench or Bedding:
   1. Excavate and backfill trench in accordance with Section 31 23 33.
   2. Clean each pipe length thoroughly and inspect for compliance to Specifications.
   3. Install piping according to manufacturer's directions after joints have been thoroughly cleaned and examined.
   4. Lay pipe in only suitable weather with good trench conditions.
      a. Never lay pipe in water except where approved by Engineer.
   5. Seal open end of line with watertight plug if pipe laying stopped.
   6. Remove water before removal of plug.

H. HDPE Pipe Joining Procedures:
   1. HDPE pipe joints shall be fused on the surface prior to installation into the trench.
      a. Alternative methods of fusing shall be approved by the Engineer.
      b. PE pipe 1 IN and under shall be socket fused.
      c. PE pipe joints 1-1/2 IN and over shall be butt fused.
   2. Personnel joining pipe by fusion method, must be qualified by type of fusion (i.e., butt fusion, socket fusion or sidewall fusion) and size of pipe.
   3. Visually inspect each joint inside and outside for damage, dirt, moisture, or any other abnormalities prior to fusing.
   4. Perform all joint fusion in strict accordance with the manufacturer's specifications.
   5. All fusion equipment must be approved by the manufacturer and operated by qualified and certified operators.
      a. Cost for testing and certifying personnel shall be borne by the Contractor.
   6. Place warning tape and tracer wire in trench directly over buried piping.
   7. See Section 10 14 00.

I. At PVC leachate riser install protective barriers on two (2) sides of each riser for protection.

J. Provide caps on end of the leachate collection line and as indicated on Drawings.

K. Backfill around piping according to the detail shown on Contract Drawings and Section 31 23 00.

L. Identify each length of pipe clearly at intervals of 5 FT or less.
   1. Include manufacturer's name and trademark.
   2. Nominal size of pipe, appurtenant information regarding polymer cell classification and critical identifications regarding performance Specifications, and "NSF" approvals when applicable.

M. Install pipe and fittings in accordance with ASTM D2321 and as recommended by the manufacturer.

3.2 CONNECTIONS WITH EXISTING PIPING AND MANHOLES

A. Where connection between new work and existing work is made, use suitable and proper fittings to suit conditions encountered.

B. Perform connections with existing piping at time and under conditions which will least interfere with Owner’s operation.

C. Undertake connections in fashion which will disturb system as little as possible.

D. Once tie-in to each existing system is initiated, continue work continuously until tie-in is made and tested.

3.3 FIELD QUALITY CONTROL

A. TV Inspection of Leachate:
   1. 30 days after installation is complete, inspect entire length of leachate pipe installed under current contract by closed circuit TV (CCTV), using CCTV equipment capable of providing color pictures and video tape.
      a. TV following testing.
   2. Correct any structural defects, misalignments or leaks, if any, immediately upon discovery.
   3. After all defects have been corrected, inspect entire length of leachate pipe by TV.
   4. Repeat paragraphs 1-3 until all defects have been corrected.
   5. Provide video tape and reports of all CCTV inspection to Owner.

3.4 CLEANING

A. Cleaning:
   1. Clean interior of piping systems thoroughly before installing.
   2. Maintain pipe in clean condition during installation.
   3. Before jointing piping, thoroughly clean and wipe joint contact surfaces and then properly dress and make joint.
   4. Remove cuttings, grindings, and fusion rings or burrs from inside of pipes and dispose as waste outside of project area. Cuttings shall not be present in any portion of the constructed work.
   5. Clean and remove grease, dirt, or other foreign materials.
   6. At completion of Work prior to Final Acceptance, thoroughly clean work installed under these Specifications.
      a. Clean equipment, pipe, and fittings of materials which may have accumulated by operation of system, from testing, or from other causes.

3.5 LOCATION OF BURIED WORK

A. Record Drawings shall show exact location and description of buried system components.
   1. See Section 01 71 23.
   2. Include such information as location, elevation, coverage, supports and additional pertinent information.

END OF SECTION

APPENDIX A

CQA PLAN

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix 5D

Construction Quality Assurance Plan

Metro Waste Authority

Metro Park West Landfill

Boone County MSWLF Unit

Permit No. 08-SDP-03-84P

Submittal Date: April 1, 2021

Metro Waste Authority

This page intentionally left blank.

Revisions and Updates

Date	Revisions Made
April 2021	April 2021 revisions include Attachment A updates of particle size analysis ASTM standards to reflect current practices. No other revisions were incorporated.

This page intentionally left blank.

Table of Contents

List of Attachments

This Page Intentionally Left Blank.

Section 1.0
Overview

The Construction Quality Assurance Plan (CQAP) will document that the constructed unit meets or exceeds design criteria contained in the permit issued by Iowa Department of Natural Resources (IDNR). The CQAP describes: 1) observations, inspections, tests, and measurements to be performed; 2) roles and responsibilities of various parties in performing Construction Quality Assurance (CQA) and Construction Quality Control (CQC); and 3) documentation, recordkeeping, and certifications.

The procedures described below are tailored to the Metro Waste Authority (MWA) Metro Park West (MPW) Landfill Boone County MSWLF unit and are in part excerpted or adopted from 567 Iowa Administrative Code (IAC) 113.7(6), EPA/540/R-92/073 Technical Guidance Document, EPA 530-R-93-017 Technical Manual - Solid Waste Disposal Facility Criteria, and EPA/600/R-93/182 Technical Guidance Document. The construction units covered in this plan consist of the landfill subgrade, liner, and leachate collection system. The landfill liner system includes a 2-foot recompacted clay liner overlain with 60-mil high density polyethylene (HDPE) flexible membrane liner (FML). The leachate collection system includes a geotextile overlying the FML, a 12-inch drainage layer, leachate conveyance collection piping (slotted or perforated) in trenches, sumps, level sensors with pumps, risers, manholes, header pipe, lift station, and leachate load-out station. The specific MPW Landfill Boone County MSWLF unit components addressed in this plan include:

1. Subgrade
2. Recompacted Clay Layer
3. Geosynthetics
4. Leachate Collection System (including drainage layer, coarse aggregate, and collection piping)
5. Drainage Structures
6. Foundations

CQA consists of a planned series of observations and tests used to provide quantitative criteria with which to accept the final product. CQC is an ongoing process of measuring and controlling the characteristics of the product in order to meet manufacturer or project specifications.

CQC is a production tool that is employed by the manufacturer of materials and by the contractor installing the materials at the site. CQA, by contrast, is a verification tool employed by MWA to ensure that the materials and installation meet project specifications. CQC is performed independently of the CQAP. For example, while a geomembrane liner installer will perform CQC testing of field seams, the CQA program may require independent CQA testing of those same seams by a third-party inspector.

This Page Intentionally Left Blank.

Section 2.0
CQA and CQC Team

The CQAP will be implemented under the supervision of an Iowa registered professional engineer. MWA will designate a registered professional engineer, who will be identified as the CQA officer, to oversee the execution of the CQAP and related field and testing activities. The CQA officer will not be an employee of MWA, the construction company or construction contractor. Prior to start of an activity, the CQA officer or individual within the CQA officer's staff will be identified so that MWA, IDNR, or others can verify that individual's qualifications. MWA may elect to utilize contract firms for monitoring, observation and testing services.

The CQAP and CQC plan will be implemented through inspection activities that include visual observations, field testing, and evaluation of the test data. Inspection activities will typically be concerned with four separate functions:

- Quality Control (QC) inspection by the manufacturer to provide an in-process measure of the product quality and its conformance with the project plans and specifications. Typically, the manufacturer will be required to provide QC test results to certify that the product conforms to project plans and specifications.
- Construction Quality Control (CQC) inspection by the contractor to provide an in-process measure of construction quality and conformance with the project plans and specifications, thereby allowing the contractor to correct the construction process if the quality of the product is not meeting the specifications and plans.
- Construction Quality Assurance (CQA) testing by MWA performed, usually through the third-party testing firm to provide a measure of the final product quality and its conformance with project plans and specifications.
- Regulatory inspection or documentation review, if required, to verify that the final product conforms with all applicable codes and regulations.

The responsibilities of MWA's CQA officer and the CQA officer's staff vary by physical component being constructed. The personnel will be assigned responsibilities based upon knowledge and competence to perform CQA in a specific area. Prior to start of an activity, the CQA officers or individual within the CQA officer's staff will be identified so that MWA, IDNR, or others can verify that individual's qualifications.

Activities of the CQA officer are essential to document quality of construction. The CQA officer's responsibilities and those of the CQA officer's staff members may include:

- Communicating with the contractor;
- Interpreting and clarifying project drawings and specifications with the designer, MWA, and contractor;
- Recommending acceptance or rejection by MWA of work completed by the construction contractor;
- Submitting blind samples (e.g., duplicates and blanks) for analysis by the contractor's testing staff or one or more independent laboratories, as applicable;

- Notifying MWA of construction quality problems not resolved on-site in a timely manner;
- Observing the testing equipment, personnel, and procedures used by the construction contractor to check for detrimentally significant changes over time;
- Reviewing the construction contractor's quality control recording, maintenance, summary, and interpretations of test data for accuracy and appropriateness; and
- Reporting to MWA on monitoring results.

MWA will have the authority to stop work or reject work if problems or deficiencies are encountered.

Section 3.0
Inspection, Sampling, and Testing

The following is an overview of CQA and CQC activities, by major physical components, to be undertaken before, during, or after construction. Reference should be made throughout this discussion to Attachment A for a more detailed list of major material testing methods and frequency. Frequency in Attachment A may be adjusted based upon final material sources, field observations, and results of testing during construction. Additional QC, CQC, and CQA provisions and standards are anticipated to be included in final construction plans and specifications and for minor system components. Final construction plans and specifications will further delineate sampling strategies, including methods of determining sample locations, frequency of sampling, acceptance and rejection criteria, and methods of implementing corrective measures.

Storage, handling, preservation, and transport of soil samples will be done according to ASTM D4220.

3.1 Subgrade

The subgrade shall be constructed as follows:

- All trees, stumps, roots, boulders, debris, and other material capable of deteriorating in situ material strength or of creating a preferential pathway for contaminants shall be completely removed or sealed off prior to construction.
- The subgrade shall be graded to provide a smooth working surface on which to construct the compacted clay liner.
- The subgrade shall not be constructed in or with frozen soil.

The subgrade shall be proof-rolled and observed for soft spots and/or sharp protrusions. Unacceptable subgrade soil shall be removed and replaced with suitable material.

Construction survey points shall be set to confirm that the proper subgrade elevations have been reached prior to constructing the compacted clay liner. These checks are the responsibility of the contractor with spot checks by the CQA officer or their delegate.

3.2 Recompacted Clay Layer

Recompacted clay layer covers both the recompacted clay liner and the final cover infiltration layer for the MPW Landfill Boone County MSWLF unit. Quality control testing performed on soil materials used in the construction of the liner and final cover will include source testing and construction testing. Source testing defines material properties that govern material placement. Source testing will typically include moisture content, soil density (i.e., proctors), Atterberg limits, grain size, and laboratory hydraulic conductivity.

3.2.1 Soil Source Development and Stockpile

During excavation, color and soil plasticity shall be screened using the visual-manual procedures outlined in ASTM D2488. Personnel performing this work shall have a minimum of 2 years of experience in soil classification and testing. Visual classifications shall be conducted at a minimum frequency identified in Attachment A. More frequent testing will be required for off-site sources or if visual observations indicate the excavation is moving into a new soil profile.

Soils passing the field screening criteria for use as recompacted clay layer material will be excavated and, where appropriate, stockpiled for further processing. During excavation and prior to final placement, additional sampling may be performed for confirmatory laboratory classification testing. If stockpile testing is necessary, laboratory classification testing shall be performed on representative samples at the frequency identified in Attachment A. Laboratory classification testing shall consist of liquid and plastic limits in accordance with ASTM D4318 and particle size analysis in accordance with ASTM D422. Stockpiled materials from off-site sources shall not be used for recompacted clay layer construction until laboratory test results are completed and the results are evaluated by the CQA officer.

3.2.2 Soil Source Assessment

The proposed recompacted clay layer soils are on-site: oxidized and unoxidized glacial till.

CQA personnel will perform assessment tests on each principal type or combination of material proposed by the contractor for use as the recompacted clay layer to assure compliance with specified requirements and to develop compaction requirements for placement. Assessment tests consist of classification testing, moisture-density (compaction) testing, and hydraulic conductivity testing.

A representative sample from each principal type or combination of materials identified by the contractor for use in constructing the recompacted clay layer shall be tested by CQA personnel to establish a moisture-density relationship (compaction curve) using ASTM D698 compaction methods. A minimum of five points shall be used to develop each compaction curve. Moisture contents for each point shall be determined as described in the following paragraph. The compaction curves shall be plotted on a single graph of dry density versus moisture content.

A set of hydraulic conductivity tests shall be performed on representative samples of each principal type or combination of materials. As noted above, a minimum of five test specimens will be collected. These specimens shall be trimmed from the center portion of the compaction plugs. Moisture content of the corresponding compaction point shall be determined on the trimmings collected from each end of the hydraulic conductivity specimen. Carefully collect and preserve these trimmings to maintain the representative moisture content of the compaction plug and the hydraulic conductivity specimen. Hydraulic conductivity testing shall be conducted in accordance with ASTM D5084. Saturation of test specimens shall be verified by determination of the B coefficient. The B coefficient must be at least 0.95. The B coefficient is defined as the change in pore water pressure divided by the change in confining pressure. The effective confining pressure shall not exceed 3 pounds per square inch (psi).

An "Acceptable Zone" of moisture contents and densities shall be developed based on the Daniel Method and displayed on the compaction curve graphs for each principal type of material or combination of materials. The "Acceptable Zone" shall consist of moisture-density values that meet a hydraulic conductivity of 1×10^{-7} cm/sec for the recompacted clay liner and 1×10^{-7} cm/sec for the final cover infiltration layer, and shall be adjusted (i.e. further restricted) as necessary based on moisture and density requirements included in project specifications. Soil test data and associated Acceptable Zones established during prior cell liner construction projects may be utilized for future liner construction, provided similar type or combinations of materials are used. Use of previously established Acceptable Zones shall be verified by comparison of visual classification, Atterberg limits, and grain size distribution testing, and by the engineering judgment of the CQA officer.

3.2.3 Test Pad

A soil test pad may be constructed for each soil material type and combination used in liner construction to verify that the materials and methods of construction proposed for the

recompacted clay layer can result in compliance with performance objectives concerning hydraulic conductivity. If used, the test pad shall be constructed with the same soil liner materials, preprocessing procedures, construction equipment, and construction methods proposed for the actual recompacted clay liner component. The minimum test pad size is 40 feet by 60 feet.

The test pad may be incorporated into the final construction if properly constructed, and tests indicate satisfactory hydraulic conductivities are achieved. Therefore, moisture and density testing required for the recompacted clay layer will also be performed on each test pad.

3.2.4 Recompacted Clay Layer Construction

Quality assurance testing for the recompacted clay layer includes density, water content, moisture-density relationship (Proctor), and soil uniformity testing at frequencies identified in Appendix A. Generally, the tests will be performed by an individual or an entity independent of the contractor. Acceptance of an area (e.g., a given lift of fill on the basis of a test series) will be based on the Acceptable Zone plot, as modified by the test pad results. Any "corrected" moisture-density values not falling within the acceptable range will be rejected, and the area will be reworked.

The recompacted clay layer shall consist of 2 feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. Soil shall be placed in loose lifts no thicker than 8 inches. A minimum of five field moisture and density tests per 6-inch compacted lift per acre shall be performed to verify that the correct moisture and density, as correlated to hydraulic conductivity by laboratory analysis, has been achieved. For failed tests, a retest shall be conducted. If the retest fails, the limits of the failed area shall be determined through additional moisture and density testing. The failed material shall be removed and replaced or recompacted.

All tests requiring penetrations into the recompacted clay layer lift will be repaired. Repairs will be a function of the size of penetration and will include backfilling with select materials. Backfill materials will consist of granular or pelletized bentonite. If it is determined through quality assurance testing that the materials in an area do not conform to specifications, the extent of the area requiring repair must be defined. To define the limits of the area that requires repair, additional moisture-density tests will be performed. The contractor will repair the area that extends from the failing test out to the boundaries defined by passing CQA tests.

Extensive on- and off-site source testing is proposed to verify that only suitable soils of consistent material type or combination are utilized in construction. As a result, deficiencies should be limited to inadequate adherence to construction specifications in terms of placement. Visual observation and ongoing soil uniformity testing (Atterberg limits and percent fines) will be utilized to verify soil consistency during construction. Appendix A provides requisite test frequencies for soil uniformity testing.

If CQA testing indicates improper soils were utilized, the defective material will be removed. If subsequent CQA testing indicates improper soil moisture or density levels, the defective construction may be: 1) removed and replaced; 2) adjusted and reworked in place; or 3) scarified and reworked. MWA's construction contractor will make repairs required to correct deficiencies. CQA personnel will observe repairs and perform additional testing to confirm suitable construction, conformance with project specification, and conformance with hydraulic conductivity requirements when necessary.

Final construction plans and specifications, along with the contractor's CQC program, will address:

- Preparation and compaction of foundation material (i.e., base grade) to the required bearing strength;
- Methods of controlling uniformity of the soil material;
- Compactive effort (e.g., type of equipment, number of passes) to achieve required soil density and hydraulic conductivity;
- Lift thickness and placement procedures to achieve uniformity of density throughout a lift and the absence of apparent boundary effects between lifts or between placements in the same lift;
- Test procedures for controlling the quality of construction;
- Skill and competence of the construction team, including equipment operators and quality control specialists; and
- Methods to protect against environmental degradation (e.g., drying, cracking, heaving, frost impacts).

As discussed in Section 3.7, surveying techniques and visual observation will be used to determine total thickness of clay liner.

Prior to placement of material on the recompacted clay layer, visual inspection will be performed by CQA and CQC personnel to establish suitability of the constructed layer including absence of debris, clods, cracks, organic matter, rocks, protrusions, or other detrimental features. If detected, the condition will be corrected (defects removed, soil replaced) prior to construction of subsequent layers.

3.3 Geosynthetics

Source testing and material quality control testing will be performed prior to material installation. These CQC steps involve manufacture, fabrication, storage at the factory, shipment, and storage at the site of the geomembrane. Manufacturers will be required to certify thickness, width, and length as well as chemical/resin formulation and material properties in accordance with Geosynthetics Research Institute (GRI) Standard GM 13 or as established during final design. Manufacturers will be required to submit information demonstrating testing of any factory fabricated seams. Information may be required on factory storage and shipment where concerns are identified. At the site, records will be maintained on any material received (especially material received in damaged condition) and on on-site storage and handling practices. Lining materials delivered to the site will be inspected for damage by the installer, unloaded, and stored with a minimum of handling. Materials will be stored in accordance with the manufacturer's recommendation. The storage shall be such that:

- Unloading of rolls at the job site's temporary storage location should be such that no damage to the lining materials occur;
- Pushing, sliding, or dragging of rolls of lining materials should not be permitted;
- Temporary storage at the job site should be in an area where standing water cannot accumulate to a depth that may detrimentally impact the stored product;
- The ground surface should be suitably prepared such that no large stones or other rough objects that could damage the lining materials are present;
- Temporary storage of rolls of lining materials in the field should not be so high that crushing of the core or flattening of the rolls occur; and

- Suitable means of securing the rolls should be used such that shifting, abrasion, or other adverse movement does not occur.

Prior to installation, the contractor, material installer, and CQA personnel will inspect the top of the recompacted clay layer to assess its suitability for installation of the FML. During deployment, the CQA personnel, the installer, and possibly the manufacturer's representative will observe the layout, ballasting, and seaming. Records will be maintained to document panel layout, weather-related impacts (e.g., wind and moisture), and material handling. Once deployed, the entire roll or panel will be observed for blemishes, scratches, and imperfections. CQA personnel observe field seaming and seam testing.

As with the construction of the recompacted clay layer, installation of the geomembrane will be in conformance with a quality assurance/quality control plan. Tests performed to evaluate the integrity of geomembrane seams will be both "destructive" and "non-destructive." All seams failing the non-destructive or destructive tests shall be repaired.

3.3.1 Trial Seams

Trial seams will be done twice daily during installation to demonstrate prequalifying experience for personnel, equipment, and procedures. Trial seams will be performed on the identical geomembrane material under the same climatic conditions as the actual field production seams will be made. Trial seams will also be made whenever personnel or equipment are changed and when climatic conditions reflect wide changes in geomembrane temperature or when other conditions occur that could affect seam quality. Criteria for passing and failing tests are included in project specifications.

3.3.2 Non-Destructive Seam Testing

Non-destructive test methods will be conducted in the field on an in-place geomembrane. These test methods determine the integrity of the geomembrane field seams. All seams shall be non-destructively tested. Non-destructive test methods may include vacuum box or pressurized dual seam tests. Seam sections that fail non-destructive tests will be carefully delineated, patched or reseamed, and retested. All repaired areas shall be non-destructively tested by vacuum box methods. Large patches or reseamed areas may be subjected to destructive test procedures for quality assurance purposes. The final plans and specifications will describe the degree to which non-destructive and destructive test methods will be used in evaluating failed portions of non-destructive seam tests. For HDPE, double-wedge thermal seams will be pressure tested in accordance with GRI GM6 [maximum of 30 psi with no more than a 3-psi pressure drop over a 5 minute time period]. Other fusion welded seams will be tested in accordance with ASTM D5641 (2.5 psi vacuum box). Other testing will conform with recommendations of the Geosynthetic Research Institute or ASTM, as applicable.

3.3.3 Destructive Seam Testing

Quality control testing of geomembranes generally includes peel and shear testing of weld sections prior to commencing seaming activities and at periodic intervals throughout the day. Additionally, destructive peel and shear field tests are performed on samples from the installed seams.

Quality assurance testing will generally require that an independent laboratory perform peel and shear tests of samples from installed seams. The samples may be collected randomly or in areas of suspect quality. Seams will generally be tested at intervals equivalent to one sample per every 300 to 400 feet of installed seam for extrusion welds and every 500 feet for fusion-welded seams.

Where possible, destructive tests on continuous seams should be limited to side slopes and should not be taken on basal portions of the cell liner or the leachate sump.

For dual hot wedge seams, both the inner and outer seam may be subjected to destructive shear tests at the independent laboratory. Destructive samples of installed seam welds will generally be cut into several pieces and distributed to:

- The installer to perform CQC testing;
- MWA to retain and appropriately catalog or archive; and
- An independent laboratory for CQC peel and shear testing.

Minimum shear and peel strength values for the HDPE will be based on compliance with GRI GM19. Minimum acceptable values for shear and peel strength of other geomembranes will conform to recommended minimum values in GRI GM19.

If the test results for a seam sample do not pass the acceptance/rejection criteria, then samples will be cut from the same field seam on both sides of the rejected sample location. Samples will be collected and tested until the area limits of the low quality seam are defined. Corrective measures may involve seaming a cap over the length of the rejected seam or reseaming. All corrective measures will be nondestructively tested.

3.3.4 Geomembrane CQA Observation

The responsibilities of the CQA personnel for the installation of the geomembrane are generally the same as the responsibilities for the construction of the recompacted clay layer, with the following additions:

- Observation and documentation of geomembrane in storage, and handling of the geomembrane as the panels are positioned on site;
- Observation of seam overlap, seam preparation prior to seaming, and material underlying the geomembrane;
- Observation of destructive testing conducted on trial welds prior to seaming;
- Observation of destructive seam sampling, submission of the samples to an independent testing laboratory, and review of results for conformance with specifications;
- Observation of seams and panels for defects due to manufacturing and/or handling and placement;
- Observation of pipe penetrations, boots, and welds in the geomembrane; and
- Preparation of reports indicating sampling conducted and sampling results, locations of destructive samples, locations of patches, locations of seams constructed, and description of significant problems encountered during installation. The final panel plan indicating panel layout, seams, test locations, and repairs shall be provided by the geomembrane installer as a CQC requirement.

3.4 Leachate Collection System

The purpose of leachate collection system CQA is to document that the system construction is in accordance with the design plans and specifications. Prior to construction, material submittals and manufacturer quality control data or specifications will be reviewed to confirm that they meet the construction plans and specifications. These include:

- Geotextiles;

- Pipe size, materials, and perforations;
- Granular material gradation and prefabricated structures (sumps, manholes, etc.);
- Mechanical, electrical, and monitoring equipment (if utilized); and
- Concrete forms and reinforcement.

The leachate collection system will be inspected and surveyed upon its completion to verify that it has proper grading and is free of debris and liquids.

During construction, the following activities, as appropriate, will be observed and documented:

- Pipe bedding placement including quality, thickness, and area coverage;
- Granular filter layer placement including material quality and thickness;
- Pipe installation including location, configuration, grades, joints, alignment of perforations, filter layer placement, final flushing, and camera scoping;
- Granular drainage layer placement including protection of underlying liners, thickness, overlap with filter fabrics (if applicable), and weather conditions;
- Geotextile/geofabric placement including coverage and overlap;
- Sumps, tanks, or structure installation; and
- Mechanical and electrical equipment installation (if utilized), including testing.

In addition to field observations, actual field and laboratory testing may be performed to document that the materials meet the design specifications. These activities will be documented and should include the following:

- Geotextile sampling and testing;
- Granular drainage aggregate and coarse aggregate sampling and testing for grain size distribution; and
- Testing of pipes for leaks, obstructions, and alignments.

Granular drainage layers above the liner will not be compacted, except as a result of placement methods. No minimum density specification is anticipated.

Upon completion of construction, each component will be inspected to identify damage that may have occurred during its installation or during construction of another component (e.g., pipe crushing during placement of granular drainage layer). Identified damage will be repaired and these corrective measures documented in the CQA records.

As discussed in Section 3.7, surveying techniques and visual observation will be used to determine total thickness of drainage layers and coarse aggregate.

3.5 Drainage Structures

Drainage structure (e.g., culvert, outlet or inlet structures, and silt fences) quality control will include review of manufacturer material specifications prior to construction to verify that they conform to plans and specifications. Prior to installation the foundation materials (soils, pipe bedding, etc.) will be inspected. Upon completion, installation will be inspected and surveyed to verify proper lines and grades, free of debris, proper installation (in accordance with plans and specifications or manufacturer's installation instructions) and adequate cover thickness, as

applicable. Drainage structure CQA will include observation and documentation similar to that specified in Section 3.4, above.

3.6 Foundations

Foundations may consist of soil or concrete structures. Soil foundations CQC and CQA plans are generally described in Sections 3.2 and 3.4 on Recompacted Clay Layer and Leachate Collection System, respectively.

For concrete foundations, CQC will involve use of demonstrated concrete mixes and fabrication of rebar in accordance with approved plans and specifications. Quality control testing will involve the following:

- Concrete slump tests;
- Concrete strength tests.

CQA will involve the following:

- Visual inspection of forms, rebar, water seals, and concrete placement;
- Observation and monitoring of concrete curing;
- Observation of backfilling and installation of attached structures;
- Documentation report of observation and review of material test results.

Independent concrete testing may be conducted if a problem is suspected.

3.7 Surveying

Construction staking will be performed utilizing conventional construction layout practices. Site control will be provided by the permanent site control points already established on site. All control points are tied into the site project coordinate system. During construction, the survey crew will set grade stakes and obtain locations and elevations of as-built features.

Surveys will be used to confirm total thickness of layers. In addition, excavated measurements may be performed, as identified in Attachment A, to confirm total layer thicknesses. Surveying will include enough points to adequately determine the uniformity of the layer thickness. The average distance between survey points will be 100 feet. For multi-lift/multi-layer construction, visual observation and field measurements will be used to confirm layer thickness. Measurements will be performed using surveying, excavated samples, or other measuring techniques.

Field surveying will record liner and capping terminations, piping, and drainage structure locations within the landfill. Surveying or field measurements will also be used to record key information on record drawings related to FML panels and patching locations.

At regular intervals, record drawings of the newly constructed features and the areas filled will be prepared. The record drawings will document the final location, size, and elevation of the constructed features within the Site. The record drawings will become part of the final construction certification report.

Section 4.0
Documentation and Corrective Action

Ongoing QC, CQC, and CQA are designed to minimize deficient work and provide for corrective action prior to completion of an activity. The recordkeeping and on-site observation activities are further designed to provide documentation of compliance or non-compliance as well as corrective action.

4.1 Corrective Action

For work or physical components that do not satisfy plans and specifications, the general actions may include:

- Removal and replacement;
- Alternate welding or patching for geomembranes;
- Additional compaction and moisture adjustment for soils.

Along with the final construction plans and specification, the CQC and CQA programs and personnel will identify the deficiency and its extent. They will also ultimately define the form or extent of corrective action required.

Section 3.0 provides general discussion on corrective actions for the recompacted clay layer and geosynthetics. If materials are found to deviate from specified standards, they will either be rejected or their suitability demonstrated by additional testing and analysis. A goal of this CQAP is to prevent the inclusion and subsequent removal of defective or inappropriate materials by providing an orderly process of checks prior to final installation.

4.2 Documentation

Documentation will take several forms and will be used to demonstrate the quality of materials and the condition and manner of installation. The overall documentation will include:

- Detailed plans and specifications (final design);
- Site investigation and soil borings (soils reports);
- Contractor shop drawings and material certification reports, with an engineer's review;
- Records of on-site observation, via the CQA officer or the CQA officer's staff;
- Material laboratory test results, both by contractor and independent laboratory;
- On-site test results;
- Photographic diary; and
- Final certification report.

The final certification report shall include observations, test results, sampling locations, corrective measures performed, and other information required to certify that the CQAP has been carried out and that construction meets or exceeds the design criteria and specifications in the permit. The final certification report shall include the requirements listed in accordance with 567 IAC 113.7(6)"d", as listed below:

- Title page and index;
- Name and permit number of facility;
- Contact information for the QCA officer;
- Daily reports;
- Detailed as-built drawings; and
- QCA statement.

Attachment A

Material Testing Methods and Frequency

This page intentionally left blank.

Material Testing Methods and Frequency[1]

Material Tested	Parameter	Test Method	Minimum Test Frequency
On-Site Soil Source Development and Stockpile from Off-Site Material [2,3]	Visual Classification	ASTM D2488	1 per 5,000 cubic yards
	Atterberg Limits	ASTM D4318	1 per 10,000 cubic yards
	% Fines	ASTM D6913 (coarse-grained) and ASTM D7928 (fine-grained)	1 per 10,000 cubic yards
	Moisture-Density Relationship	ASTM D698 or D1557	1 per material type
Recompacted Clay Layer (including Test Pad)	Atterberg Limits	ASTM D4318	1 per 1,000 cubic yards
	% Fines	ASTM D6913 (coarse-grained) and ASTM D7928 (fine-grained)	1 per 1,000 cubic yards
	Moisture-Density Relationship	ASTM D698 or D1557	1 per 10,000 cubic yards or as soil type changes
	Density	ASTM D2922, D1587, D2167, or D1556	Liner – 5 per acre per 6" lift Cap – 5 per acre per 6” lift
	Water Content	ASTM D3017 or D2216	Liner – 5 per acre per 6" lift Cap – 5 per acre per 6” lift
	Total Thickness	Survey	100’ grids and at 100’ intervals at all changes in grade and terminations
	Soil Placement & Compaction	Visual Observation	Full Coverage
Erosion Layer	Total Thickness	Measurement or Survey	100’ grids and at 100’ intervals at all changes in grade and terminations
Geomembrane[4]	Seam Continuity	ASTM D5641 and GRI GM6	100% of all field welded seams
	Defect/Punctures	Visual inspection	100% of all seams and liner surface
	Peel and Shear	ASTM D6392	Minimum 500 feet plus twice daily during installation
Granular Drainage Layer	Sieve Analysis (Drainage Layer only)	ASTM C136	1 per 1,500 cubic yards
	% Fines	ASTM D422	1 per 1,500 cubic yards
	Aggregate Soundness	ASTM C88	1 per source
	Total Thickness	Measurement or Survey	100’ grids and at 100’ intervals at all changes in grade and terminations
	Placement & Compaction	Visual Observation	Full Coverage (compaction if required)
	Hydraulic Conductivity	ASTM D2434	1 per source

Coarse Aggregate	Sieve Analysis (Drainage Layer only)	ASTM C136	1 per 1,500 cubic yards
	% Fines	ASTM D6913 (coarse-grained) and ASTM D7928 (fine-grained)	1 per 1,500 cubic yards
Piping	Leakage on non-pressure pipe	Low pressure air	All non-slotted sections
	Leakage on pressure pipe	Hydrostatic	All sections of pressure pipe
	Alignment	Visual Observation	All sections of pipe
Concrete (Structural)	Slump	ASTM C143	1 per placement or once per 60 cubic yards
	Strength	ASTM D39	1 per placement or once per 60 cubic yards

Notes:

[1] Tests listed are for major components. Additional material standards and CQC/CQA tests will be specified in final design, including CQC and CQA for other components of the construction

[2] FTE: full time equivalent If material is not covered by previous Acceptable Zone testing, additional testing (including ASTM D5084 hydraulic conductivity) will be required to establish a material-specific Acceptable Zone. Refer to Section 3.2.2.

[3] Storage handling preservation and transport of soil samples will be done in accordance with ASTM D4220.

[4] See project specifications for pass/fail criteria on geosynthetic components.

APPENDIX B

GEOTECHNICAL REPORT

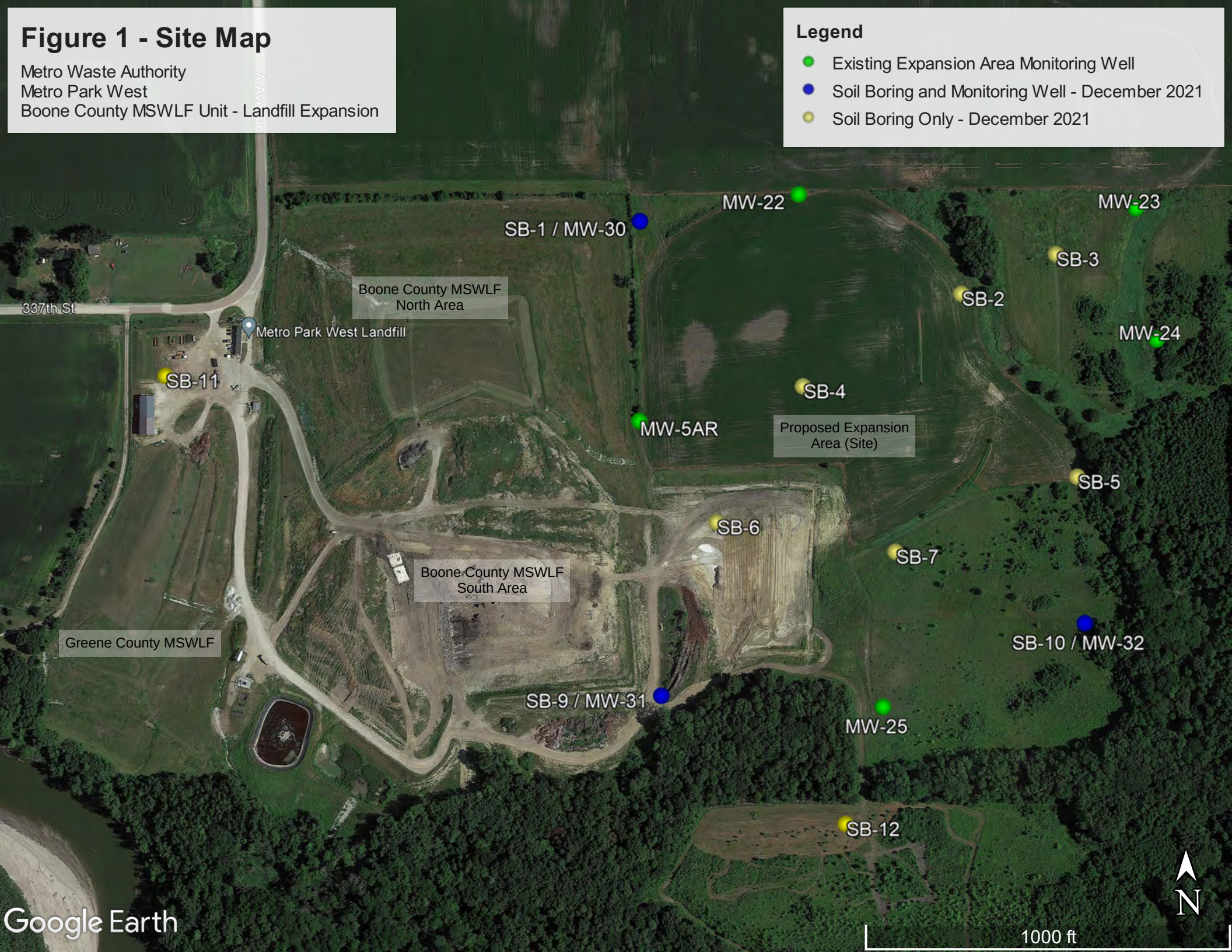
THIS PAGE INTENTIONALLY LEFT BLANK

Figure 1 - Site Map

Metro Waste Authority
Metro Park West
Boone County MSWLF Unit - Landfill Expansion

Legend

- Existing Expansion Area Monitoring Well
- Soil Boring and Monitoring Well - December 2021
- Soil Boring Only - December 2021



Soil Boring Log And Monitoring Well Construction Diagram for: SB-1/MW-30

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.867506	Y Coordinates: -94.160504
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in): 21' x 6.25"	
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL): 998.09'	
Start Date: 12/7/2021	Finish Date: 12/7/2021	Top of Casing Elevation (ASL): 999.67'	

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0				14		OH	(0"-2') Top Soil - Organic (PP:2.5 tsf)
1	Concrete				40.0		
2					40.0		
3	Riser			15	50.0	CL	(3'-5') Olive Gray, Sandy Silty Clay
4					50.0	CL	(4'-7') Gray Silty Clay
5	v				50.0		
6	Bentonite				-		
7					-		
8					95.0	CL	(8'-9') Light Brown, Sandy Silty Clay
9	Screen				95.0	SC CL	(9'-10') Sand Seam
10					-	CL	10'-13') Dark Gray, Sandy Silty Clay
11					-		
12	Sand				-		
13					75.0	SC CL	(13'-13.5') Light Brown, Sandy Clay
14					75.0	CL	(13.5'-15') Dark Gray, Sandy Silty Clay
15					75.0		
16					-		
17					-		
18					90.0	CL	(18'-20') Dark Gray, Sandy Silty Clay
19	Bottom of Well				90.0		
20	Backfilled with sand upon completion				90.0		
21	End of boring						
22							
23							
24							
25							

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	12/8/2021	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	8:00 a.m.	**Well Casing Diameter:**	2"	**SLF Permit No.:**	08-SDP-03-84P
Static Water Level (ASL):	5.81'	**Well Screen Size:**	0.010"	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-2

Facility Name: Metro Park West Landfill - Perry, Iowa	X Coordinates: 41.84020	Y Coordinates: -94.11323	
Well Contractor Name: Kris Sommer	Drilling Method**: Rotary Auger		
Well Contractor Registration No: 5222	Boring Depth (ft) x Diameter (in): 33.5' x 6.25"		
Logged by: Dan Bacehowski	Ground Surface Elevation (ASL): 993.47'		
Start Date: 12/8/2021 Finish Date: 12/8/2021	Top of Casing Elevation (ASL): -		

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0						OH	(0"-6") Top Soil - Organic (PP:2.5 tsf)
1					60.0	CL	(6"-2') Light Brown, Sandy Silty Clay (PP:1.5 tsf)
2					-		
3				27	100.0	CL	(3'-5') Light Brown, Sandy Silty Clay (PP:2.75 tsf)
4					100.0		
5					-		
6					-		
7					-		
8				24	100.0	CL	(8'-10') Light Brown/Olive, Sandy Silty Clay (PP:2.5 tsf)
9	Backfilled with cuttings upon completion				100.0		
10					-		
11					-		
12					-		
13				39	100.0	CL	(13'-15') Dark Gray, Sandy Silty Clay (PP:2.0 tsf)
14					100.0		
15					-		
16					-		
17					-		
18				53	100.0	CL	(18'-20') Dark Gray, Sandy Silty Clay (PP:>4.5 tsf)
19					100.0		
20					-		
21					-		
22					-		
23					100.0	CL	(23'-25') Dark Gray, Sandy Silty Clay (PP:>4.5 tsf)
24					100.0		
25					-		
26					-		
27					-		
28		(28'-30')	SIEVE		80.0	CL	(28'-29') Dark Gray, Sandy Silty Clay (PP:3.5 tsf)
29					80.0	SC	(29'-30') Light Brown, Well-Graded, Sandy Clay
30					-		
31					-		
32					-		
33					-	SC	(33'-33.5') Light Brown, Well-Graded, Sandy Clay
34	**End of boring**						
35							

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	12/9/2021	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	8:00 a.m.	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	8.50'	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-3

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.867222	Y Coordinates: -94.156330
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in):	35' x 6.25"
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL):	994.65'
Start Date: 12/8/2021	Finish Date: 12/8/2021	Top of Casing Elevation (ASL):	-

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0						OH	(0"-2') Top Soil - Organic
1					30.0		
2					-		
3					60.0	CL	(3'-5') Light Brown, Sandy Silty Clay (PP:6.5 tsf)
4					60.0		
5					-		
6					-		
7					-		
8					90.0	CL	(8'-10') Light Brown, Sandy Silty Clay (PP:2.75 tsf)
9	Backfilled with cuttings upon completion				90.0		
10					-		
11					-		
12					-		
13					100.0	CL	(13'-15') Light Brown, Sandy Silty Clay (PP:1.75 tsf)
14					100.0		
15					-		
16					-		
17					-		
18		(18'-19.5')	PERM		90.0	CL	(18'-19') Light Brown, Sandy Silty Clay (PP:>4.5 tsf)
19					90.0	CL	(19'-20') Dark Gray, Sandy Silty Clay (PP:>4.5 tsf)
20					-		
21					-		
22					-		
23					90.0	CL	(23'-25') Dark Gray, Sandy Silty Clay (PP:>4.5 tsf)
24					90.0		
25					-		
26					-		
27					-		
28					80.0	CL	(28'-30') Dark Gray, Sandy Silty Clay (PP:4.25 tsf)
29					80.0		
30					-		
31					-		
32					-		
33					100.0	CL	(33'-35') Dark Gray, Sandy Silty Clay (PP:4.0 tsf)
34					100.0		
35	**End of boring**						

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	-	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	-	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	-	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-4

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.866063	Y Coordinates: -94.158615
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in):	35' x 6.25"
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL):	1,001.45'
Start Date: 12/7/2021	Finish Date: 12/7/2021	Top of Casing Elevation (ASL):	-

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0						OH	(0"-2') Top Soil - Organic (PP:2.5 tsf)
1					20.0		
2					-		
3				18	20.0	CL	(3'-5') Light Brown, Sandy Silty Clay (PP:1.5 tsf)
4					20.0		
5					-		
6					-		
7					-		
8				25	100.0	CL	(8'-10') Light Brown, Sandy Silty Clay (PP:2.0 tsf)
9	Backfilled with cuttings upon completion				100.0		
10					-		
11					-		
12					-		
13				30	100.0	CL	(13'-15') Light Brown, Sandy Silty Clay (PP:1.5 tsf)
14					100.0		
15					-		
16					-		
17					-		
18				47	30.0	CL	(18'-19') Dark Gray, Sandy Silty Clay (PP:2.5 tsf)
19					30.0	SC	(19'-20') Sand Seam (PP:1.0 tsf)
20					-		
21					-		
22					-		
23				27	100.0	CL	(23'-25') Dark Gray, Sandy Silty Clay (PP:3.75 tsf)
24					100.0		
25					-		
26					-		
27					-		
28				46	90.0	CL	(28'-30') Dark Gray, Sandy Silty Clay (PP:2.5 tsf)
29					90.0		
30					-		
31					-		
32					-		
33		(33'-35')	SIEVE		100.0	CL	(33'-35') Dark Gray, Sandy Silty Clay (PP:4.0 tsf)
34			HYDRO		100.0		
35	**End of boring**		ATTER				

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	-	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	-	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	-	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-5

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.865462	Y Coordinates: -94.156160
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in):	35' x 6.25"
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL):	1,001.45'
Start Date: 12/6/2021	Finish Date: 12/6/2021	Top of Casing Elevation (ASL):	-

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0				14		OH	(0"-6") Top Soil - Organic
1					50.0	CL	(6"-2') Light Brown, Sandy Silty Clay (PP:3.0 tsf)
2					-		
3					80.0	CL	(3'-5') Light Brown, Sandy Silty Clay (PP:3.0 tsf)
4					80.0		
5					-		
6					-		
7					-		
8		(8'-10')	PERM	39	-	CL	(8'-10') Light Brown, Sandy Silty Clay (PP:3.5 tsf)
9	Backfilled with cuttings upon completion				-		
10					-		
11					-		
12					-		
13				33	100.0	CL	(13'-15') Dark Brown, Sandy Silty Clay (PP:3.25 tsf)
14					100.0		
15					-		
16					-		
17					-		
18		(18'-20')	SIEVE	34	20.0	CL	(18'-20') Dark Gray, Sandy Silty Clay, Sand Seam w/ Moisture (PP:3.25 tsf)
19			HYDRO		20.0		
20			ATTER		-		
21					-		
22					-		
23					100.0	CL	(23'-25') Dark Gray, Sandy Silty Clay (PP:1.75 tsf)
24					100.0		
25					-		
26					-		
27					-		
28					100.0	CL	(28'-30') Dark Gray, Sandy Silty Clay (PP:4.5 tsf)
29					100.0		
30					-		
31					-		
32					-		
33					100.0	CL	(33'-35') Dark Gray, Sandy Silty Clay (PP:4.5 tsf)
34					100.0		
35	End of boring						

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	-	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	-	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	-	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-6

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.865383	Y Coordinates: -94.159730
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in):	32.5' x 6.25"
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL):	987.6'
Start Date: 12/7/2021	Finish Date: 12/7/2021	Top of Casing Elevation (ASL):	-

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0	Backfilled with cuttings upon completion					CL	(0"-2') Light Brown, Sandy Silty Clay
1					-		
2					-		
3					100.0	CL	(3'-5') Light Brown/Olive, Sandy Silty Clay (PP:4.0 tsf)
4					100.0		
5					-		
6					-		
7					-		
8					80.0	CL	(8'-10') Dark Brown, Sandy Silty Clay (PP:2.5 tsf)
9					80.0		
10					-		
11					-		Moist
12					-		
13					100.0	CL	(13'-15') Dark Gray, Sandy Silty Clay (PP:3.25 tsf)
14					100.0		
15					-		
16					-		
17					-		
18					-	CL	(18'-20') Dark Gray, Sandy Silty Clay
19					-		
20					-		
21					-		
22					-		
23					-	CL	(23'-25') Dark Gray, Sandy Silty Clay, Shale Encountered
24					-		
25					-		
26					-		
27					-		
28					-		
29					80.0		(29.5'-31') Weathered Shale (PP:>4.5 tsf)
30					80.0		
31					-		
32					-		(32.5') Limestone
33	**End of Boring**						
34							
35							

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	-	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	-	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	-	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-7

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.865012	Y Coordinates: -94.157978
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in):	35' x 6.25"
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL):	989.447'
Start Date: 12/6/2021	Finish Date: 12/6/2021	Top of Casing Elevation (ASL):	-

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0						OH	(0"-2') Top Soil - Organic (PP:1.75 tsf)
1					10.0		
2					-		
3					15.0	CL	(3'-5') Organic Silt/Fill (PP:2.0 tsf)
4					15.0		
5					-		
6					-		
7					-		
8				15	30.0	SC CL	(8'-10') Clayey Sand
9	Backfilled with cuttings upon completion →				30.0		
10					-		
11					-		
12					-		
13				64	40.0	CL/SC	(13'-15') Clay, Transition Sand
14					40.0		
15					-		
16					-		
17					-		
18				29	80.0	CL/SC	(18'-20') Light Brown Sand, Dark Gray Sandy Silty Clay (PP:4.5)
19					80.0		
20					-		
21					-		
22					-		
23					80.0	CL	(23'-25') Gray, Sandy Silty Clay w/ Sand Seams (PP:3.5 tsf)
24					80.0		
25					-		
26					-		
27					-		
28				19	100.0	CL	(28'-30') Dark Gray, Sandy Silty Clay (PP:2.75 tsf)
29					100.0		
30					-		
31					-		
32					-		
33					100.0	CL	(33'-35') Dark Gray/Olive, Sandy Silty Clay (PP:4.0 tsf)
34					100.0		
35	**End of boring**						

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	-	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	-	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	-	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-9/MW-31

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.863791	Y Coordinates: -94.160466
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in):	25 x 6.25"
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL):	980.2819'
Start Date: 12/7/2021	Finish Date: 12/7/2021	Top of Casing Elevation (ASL):	984.5429

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0						OH	(0"-2') Top Soil - Organic
1	Concrete				60.0	CL	Light Brown, Sandy Silty Clay (PP:3.0 tsf)
2					60.0		
3	Riser			14	50.0	CL	(3'-5') Light Brown w/ Fill Sandy Silty Clay (PP:3.0 tsf)
4					50.0		
5					-		
6	Bentonite				-		
7					-		
8				15	75.0	CL	(8'-10') Light Brown, Sandy Silty Clay (PP: 2.25 tsf)
9					75.0		
10	v				-		
11					-		
12					-		
13				40	100.0	CL	(13'-14') Light Brown, Sandy Silty Clay (PP:4.0 tsf)
14					100.0	CL	(14'-15' (Dark Gray, Sandy Silty Clay (PP:2.5 tsf)
15					-		
16	Sand				-		
17	Screen				-		
18				27	-	CL	(18'-20') Sandy Material/Moist, Likely Sand Seam
19					-		
20					-		
21					-		
22					-		
23				63	50.0	CL	(23'-25) Dark Gray Moist Sandy Silty Clay (PP:0.5 tsf)
24					50.0		
25	End of boring				-		

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

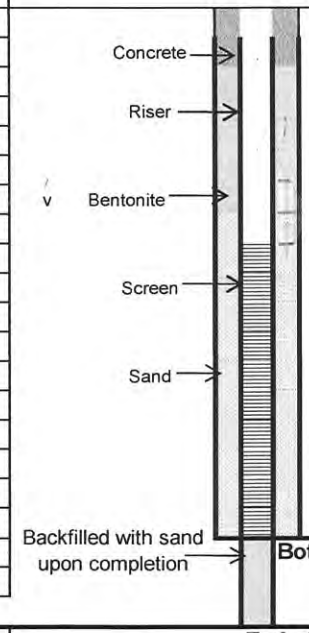
**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	12/8/2021	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	8:00 a.m.	**Well Casing Diameter:**	2"	**SLF Permit No.:**	08-SDP-03-84P
Static Water Level (ASL):	10.4'	**Well Screen Size:**	0.010"	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-10/MW-32

Facility Name: Metro Park West Landfill - Perry, Iowa	X Coordinates: 41.864460		W Coordinates: -94.156085
Well Contractor Name: Kris Sommer	Drilling Method**:	Rotary Auger	
Well Contractor Registration No: 5222	Boring Depth (ft) x Diameter (in):	20' x 6.25"	
Logged by: Dan Bacehowski	Ground Surface Elevation (ASL):	966.11'	
Start Date: 12/8/2021 Finish Date: 12/8/2021	Top of Casing Elevation (ASL):	968.58	



Depth (feet)	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0					OH	(0"-1.5') Top Soil - Organic
1				60.0	CL	(1.5'-2') Olive/Brown, Sandy Silty Clay (PP:1.75 tsf)
2				-		
3				80.0	CL	(3'-5') Light Tan/Brown (PP:1.0 tsf)
4				80.0		
5				-		
6				-		
7				-		
8	(8'-10')	SIEVE	25	30.0	CL	(8'-10') Light Brown, Sandy Silty Clay (PP:1.25 tsf)
9		HYDRO		30.0		
10		ATTER		-		
11				-		
12				-		
13			27	100.0	CL	(13'-15') Light Gray, Sandy Silty Clay (PP:4.0 tsf)
14				100.0		
15				-		
16				-		
17	(17'-19')	SIEVE		-		
18			36	-	CL	(18'-19') Dark Gray, Sandy Silty Clay (PP:4.0 tsf)
19				-	SC	(19'-20') Sand Saturated, Well-Graded
20						
21						End of boring
22						
23						
24						
25						

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	12/9/2021	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	8:00 a.m.	**Well Casing Diameter:**	2"	**SLF Permit No.:**	08-SDP-03-84P
Static Water Level (ASL):	6.38'	**Well Screen Size:**	0.010"	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-11

Facility Name: Metro Park West Landfill - Perry, Iowa		X Coordinates: 41.866283	Y Coordinates: -94.165064
Well Contractor Name: Kris Sommer		Drilling Method**: Rotary Auger	
Well Contractor Registration No: 5222		Boring Depth (ft) x Diameter (in):	25' x 6.25"
Logged by: Dan Bacehowski		Ground Surface Elevation (ASL):	1,003.50
Start Date: 12/8/2021	Finish Date: 12/8/2021	Top of Casing Elevation (ASL):	-

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0				9		OH	(0"-2') Top Soil - Organic
1				13	75		
2				18	-		
3				3,4,6	90.0	CL	(3.5'-5') Olive Gray/Gray, Sandy Silty Clay (PP:2.0 tsf)
4					90.0		
5					-		
6				6,9,14	60.0	CL	(6'-7.5') Olive Gray/Light Brown (PP:>4.5)
7					-		
8				2,4,5	50.0	CL	(8.5'-10') Light Gray/Olive, Sandy Silty Clay (PP:1.75 tsf)
9	Backfilled with cuttings upon completion				50.0		
10					-		
11					-		
12					-		
13				3,5,6	0.0	CL	(13.5'-15') Waste Material in Drill Cuttings, Wet w/ Leachate Odor
14					-		
15					-		
16					-		
17					-		
18				2,3,6	-	CL	(18.5'-20') Additional Waste Material on Drill Cuttings,Dark Gray w/ Waste Material (PP:2.5 tsf)
19					-		
20					-		
21					-		
22					-		
23				2,2,3	-	-	(23.5'-25') Waste Material w/ Liquids
24					-		
25					-		
26	**End of boring**						
27							
28							
29							
30							
31							
32							
33							
34							
35							

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	-	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	-	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	-	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: SB-12

Facility Name: Metro Park West Landfill - Perry, Iowa	X Coordinates: 41.863045	Y Coordinates: -94.158513	
Well Contractor Name: Kris Sommer	Drilling Method**: Rotary Auger		
Well Contractor Registration No: 5222	Boring Depth (ft) x Diameter (in): 35' x 6.25"		
Logged by: Dan Bacehowski	Ground Surface Elevation (ASL): 984.3219		
Start Date: 12/6/2021 Finish Date: 12/6/2021	Top of Casing Elevation (ASL): -		

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0				5		OH	(0"-2') Top Soil - Organic (PP:3.0 tsf)
1					50.0		
2				7	5.0	CL	(2'-4') Light Olive Brown Sandy Silty Clay (PP:1.5 tsf)
3					5.0		
4					15.0	CL	(4'-6') Light Olive Brown/Gray Sandy Silty Clay (PP:1.75 tsf)
5					15.0		
6				6	100.0	CL	(6'-8') Light Brown/Olive Sandy Silty Clay (PP:2.5 tsf)
7					100.0		
8					-	CL	(8'-10') Light Olive Brown (PP:4.0 tsf)
9	Backfilled with cuttings upon completion				-		
10					100.0	CL	(10'-12') Light Gray/Brown Sandy Silty Clay (PP:3.5 tsf)
11					100.0		
12					100.0		(12'-14') Light Brown/Olive Sandy Silty Clay (PP:3.5 tsf)
13					100.0		
14					100.0	CL	(14'-16') Gray/Olive Sandy Silty Clay (PP:3.75 tsf)
15					100.0		
16					100.0	CL	(16'-18') Gray Sandy Silty Clay (PP:3.0 tsf)
17					100.0		
18					-	CL	(18'-20') Dark Gray Sandy Silty Clay (PP:2.5 tsf)
19					-		
20					-		
21					-		
22					-		
23					-		
24					-		
25					-		
26					-		
27					-		
28					100.0	CL	(28'-30') Dark Gray, Sandy Silty Clay (PP:2.75 tsf)
29					100.0		
30					100.0		
31					100.0		
32					100.0		
33					100.0	CL	(33'-35') Dark Gray, Sandy Silty Clay (PP:3.75 tsf)
32					100.0		
35	End of boring				100.0		

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	-	**Borehole Diameter:**	6.25"	**Location:**	MPW Landfill
Time:	-	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	-	**Well Screen Size:**	-	**Project No.:**	10310518

Construction Materials Testing

January 19, 2022

Project No: 211566MPE

EcoSource, LLC
6424 University Ave
Windsor Heights, Iowa 50324

Re: **Geotechnical Laboratory Testing**
Metro Park West
Des Moines, Iowa

Dear Mr. Darren Fife:

As per your request, CMT has completed the laboratory testing for the above stated project. Enclosed you will find the results of the requested tests, as listed below. These samples were obtained by Eco Source and delivered to CMT's laboratory for analysis.

Sample ID	Gradation, ASTM C136	Hydrometer Analysis, ASTM D422	Atterberg Limits, ASTM D4318	Permeability, ASTM D5084
B-2 28-30 ft	X			
B-3 18-19.5 ft				X
B-3 28-30 ft	X	X	X	
B-4 33-35 ft	X	X	X	
B-5 8-10 ft				X
B-5 18-20 ft	X	X	X	
B-10 8-10 ft	X	X	X	
B-10 17-19 ft	X			

Tests were conducted in general accordance with ASTM test methods and procedures noted. Please feel free to call should you have questions or if I may be of further assistance.

Sincerely,

Sybil K. Ferrier, P.E.
Principal Engineer

JH/SF

1610 East Madison Ave. • Des Moines, Iowa 50313
(515) 263-0794 • Fax (515) 263-0851
www.cmt-iowa.com

Construction Materials Testing

APPENDIX

1610 East Madison Ave. • Des Moines, Iowa 50313
(515) 263-0794 • Fax (515) 263-0851
www.cmt-iowa.com

GENERAL NOTES - BORING LOG DESCRIPTIONS

Soil descriptions stated on the Boring Logs are based on the Unified Soil Classification System as stated in ASTM Designations D-2487 and D-2488. The Unified Soil Classification group symbol listed in the table below correlate to the group symbols listed on the Boring Logs. The classification is mainly based on visual observations to define the soil characteristics. If a more detailed soil description is required, additional soil testing will be conducted to better define the soil characteristics.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
SW	Well-graded Sand	GW	Well-graded Gravel	CL	Lean Clay	CH	Fat Clay
SP	Poorly-graded Sand	GP	Poorly-graded Gravel	ML	Silt	MH	Elastic Silt
SM	Silty Sand	GM	Silty Gravel	OL or OH	Organic Silt Organic Clay	Pt	Peat
SC	Clayey Sand	GC	Clayey Gravel				

RELATIVE DENSITY OF COARSE-GRANED SOILS		**CONSISTENCY OF FINE-GRAINED SOILS**		
SPT, bpf	*Relative Density*	*Unconfined Compressive Strength, Q_u, psf*	*Consistency*	*SPT, bpf*
0-3	Very Loose	< 500	Very Soft	0 – 2
4-9	Loose	500 - 1,000	Soft	2 – 4
10-29	Medium Dense	1,001 - 2,000	Medium Stiff	4 – 8
30-49	Dense	2,001 – 4,000	Stiff	8 – 15
50-80	Very Dense	4,001 – 8,000	Very Stiff	15 – 30
80+	Extremely Dense	8,001 – 16,000	Hard	30 – 100
		>16,000	Very Hard	>100

GRAIN SIZE TERMINOLOGY		**RELATIVE PROPORTIONS**		
Major Component of Sample	*Size Range*	*Descriptive Terms(s) (of components also present in sample)*	*Fines Percent of Dry Weight*	*Sand and Gravel Percent of Dry Weight*
Cobbles	12 in. to 3 in. (300 mm to 75 mm)	Trace	< 5	< 15
Gravel	3 in. to #4 sieve (75 mm to 4.75 mm)	With	5 – 12	15 – 29
Sand	#4 to #200 sieve (4.75 mm to 0.074 mm)	Modifier	> 12	> 30
Silt or Clay	Passing #200 sieve (> 0.074 mm)			

DRILLING AND SAMPLING ABBREVIATIONS

Drilling Methods

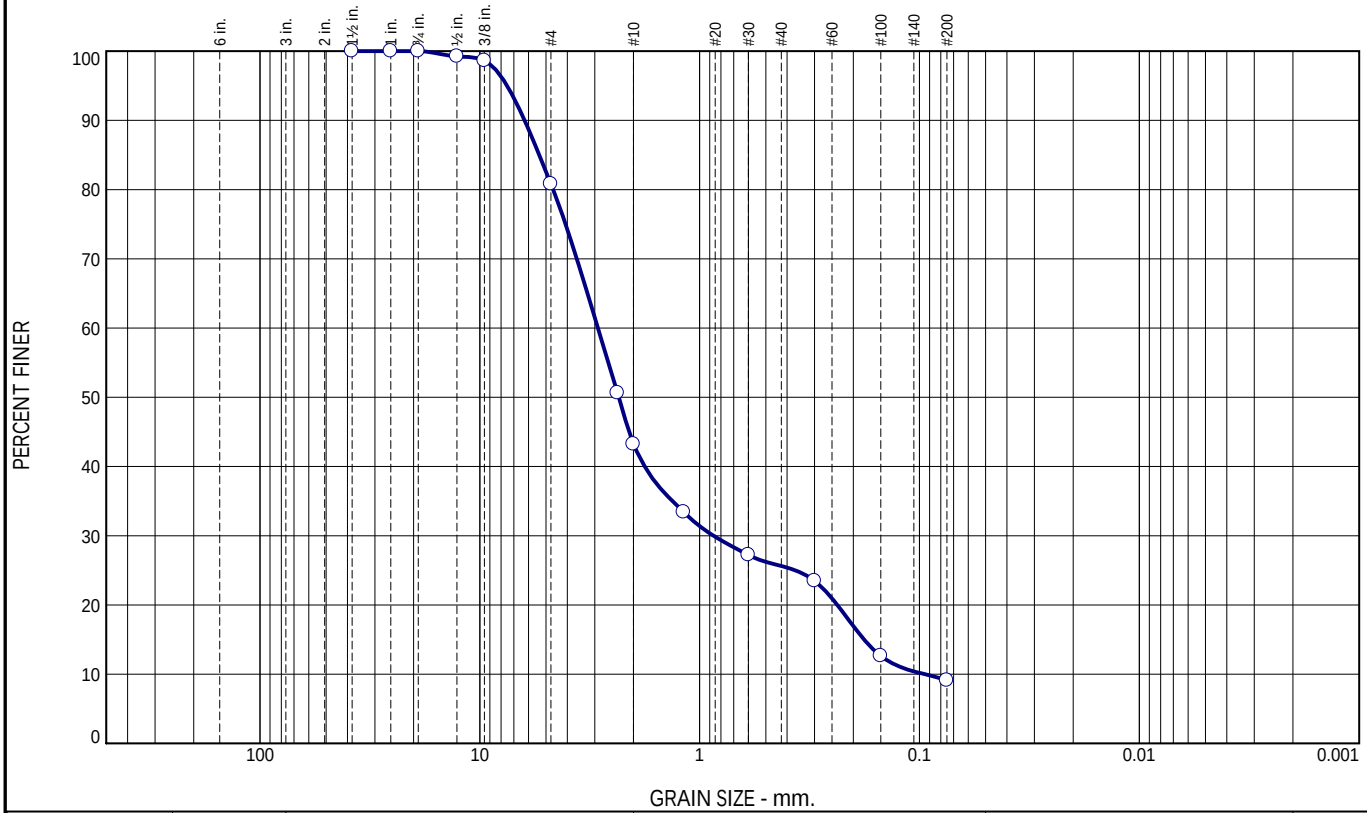
CFA – Continuous Flight Auger; typically, 4, 6, or 8 inches in diameter (ASTM D 1452)
HSA – Hollow Stem Auger; 6 or 8 inches in diameter, continuous flight auger remains in bore hole with undisturbed soil samples obtained from center of auger.
HA – Hand Auger; typically with a 4 inch or less diameter auger

Sample Types

SS - Split Spoon; samples obtained with a 140 lb manual hammer in accordance with ASTM D1586.
SSA – Split Spoon; samples obtained with a 140 lb automatic hammer in accordance with ASTM D 1586.
ST – Shelby Tube; thin walled tube samples, typically for cohesive soils, in accordance with ASTM D1587.
SPT- Standard Penetration Test: The number of blows required to drive a sampler, either split spoon or drive cone, into the soil with a 140 lb mass dropped a distance of 30 inches, in accordance with ASTM D 1586, and the number of blows are recorded in each 6 inch interval over a distance of 18 inches. Blow counts are reported for each 6 inch interval or the sum of the last two intervals is reported. The sum of the last two intervals is referred to as N, in blows per foot.
BS – Bulk Disturbed Sample
CPT – Cone Penetration Test; A device in which a 60° cone is pushed continuously into the soil and the cone end resistance is measured for skin friction and end bearing (ASTM D3441).

Particle Size Distribution Report

ASTM C136



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0	0	0	19	38	12	5	5	11		10		

Test Results (ASTM C136)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
1.5	100			
1	100			
.75	100			
.5	99			
.375	99			
#4	81			
#8	51			
#10	43			
#16	33			
#30	27			
#50	23			
#100	13			
#200	9.1			

* (no specification provided)

Material Description

Brown fine to coarse sand

Atterberg Limits

PL= LL= PI=

Classification

USCS= AASHTO=

Test Remarks

Sampled by others.

Location: B-2
Sample Number: 122021A Depth: 28-30 ft Sample Date: 12/21/21

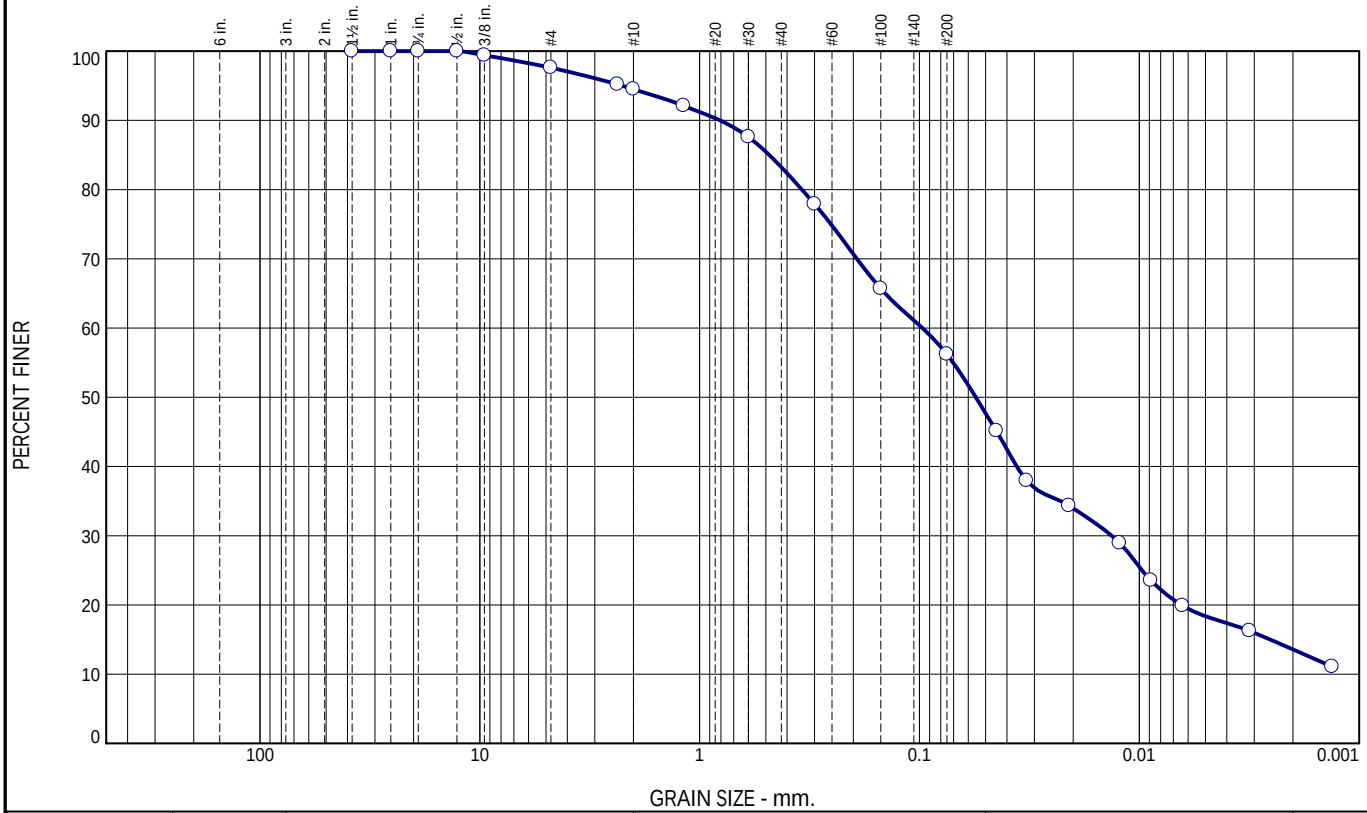
Client: Eco Source
Project: Metro Park West

Project No: 211566MPE Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Particle Size Distribution Report

ASTM D422



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0	0	0	2	4	3	6	10	15	12	14	20	14

Test Results (ASTM D422)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
1.5	100			
1	100			
.75	100			
.5	100			
.375	99			
#4	98			
#8	95			
#10	94			
#16	92			
#30	88			
#50	78			
#100	66			
#200	56			
0.0447 mm.	45			
0.0325 mm.	38			
0.0208 mm.	34			
0.0123 mm.	29			
0.0089 mm.	23			
0.0063 mm.	20			
0.0032 mm.	16			
0.0013 mm.	11			

* (no specification provided)

Material Description

Gray sandy silty clay trace gravel

Atterberg Limits

PL= 15 LL= 29 PI= 14

Classification

USCS= CL AASHTO= A-6(5)

Test Remarks

Sampled by others.

Location: B-3
Sample Number: 122021B Depth: 28-30 ft Sample Date: 12/21/21

Construction Materials Testing

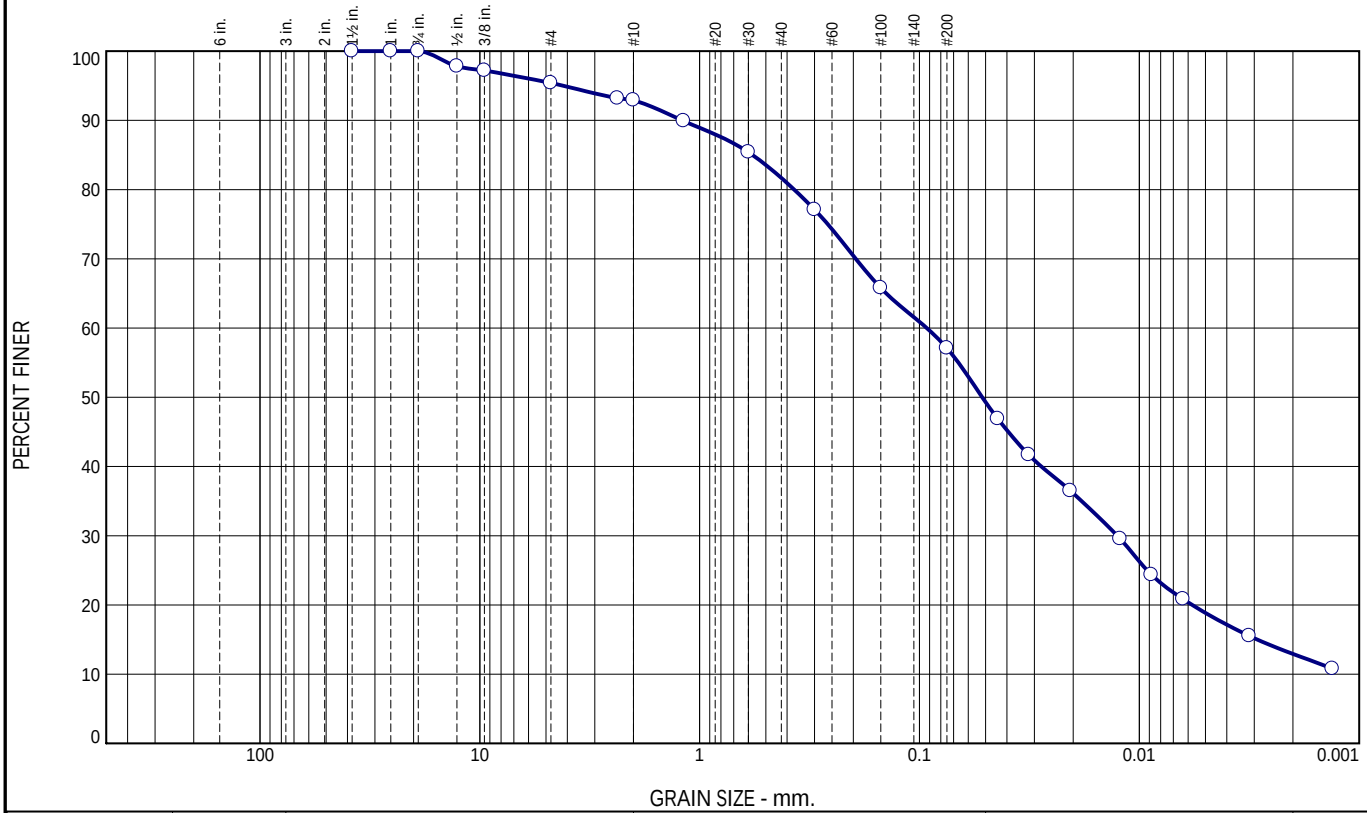
Client: Eco Source
Project: Metro Park West

Project No: 211566MPE Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Particle Size Distribution Report

ASTM D422



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0	0	0	5	2	4	5	10	13	12	13	23	13

Test Results (ASTM D422)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
1.5	100			
1	100			
.75	100			
.5	98			
.375	97			
#4	95			
#8	93			
#10	93			
#16	90			
#30	85			
#50	77			
#100	66			
#200	57			
0.0441 mm.	47			
0.0319 mm.	42			
0.0206 mm.	37			
0.0122 mm.	30			
0.0088 mm.	24			
0.0063 mm.	21			
0.0032 mm.	16			
0.0013 mm.	11			

* (no specification provided)

Material Description

Gray sandy silty clay trace gravel

Atterberg Limits

PL= 17 LL= 30 PI= 13

Classification

USCS= CL AASHTO= A-6(5)

Test Remarks

Sampled by others.

Location: B-4
Sample Number: 122021C Depth: 33-35 ft Sample Date: 12/21/21

Construction Materials Testing

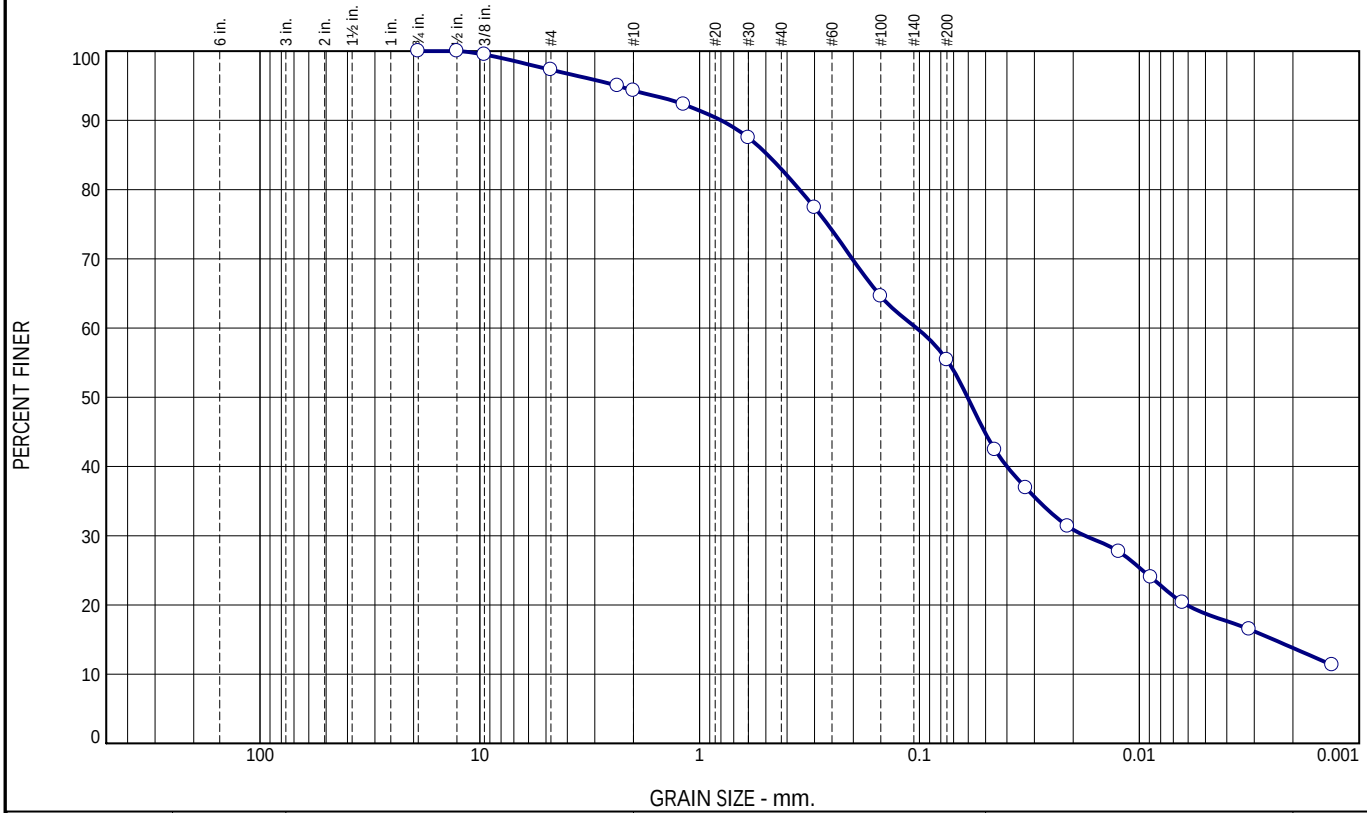
Client: Eco Source
Project: Metro Park West

Project No: 211566MPE Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Particle Size Distribution Report

ASTM D422



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0	0	0	3	3	3	6	11	14	15	14	17	14

Test Results (ASTM D422)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
.75	100			
.5	100			
.375	100			
#4	97			
#8	95			
#10	94			
#16	92			
#30	88			
#50	77			
#100	65			
#200	55			
0.0454 mm.	42			
0.0328 mm.	37			
0.0212 mm.	31			
0.0124 mm.	28			
0.0089 mm.	24			
0.0063 mm.	20			
0.0032 mm.	16			
0.0013 mm.	11			

* (no specification provided)

Material Description

Gray sandy silty clay trace gravel

Atterberg Limits

PL= 14 LL= 29 PI= 15

Classification

USCS= CL AASHTO= A-6(5)

Test Remarks

Sampled by others.

Location: B-5
Sample Number: 122021D Depth: 18-20 ft Sample Date: 12/21/21

Construction Materials Testing

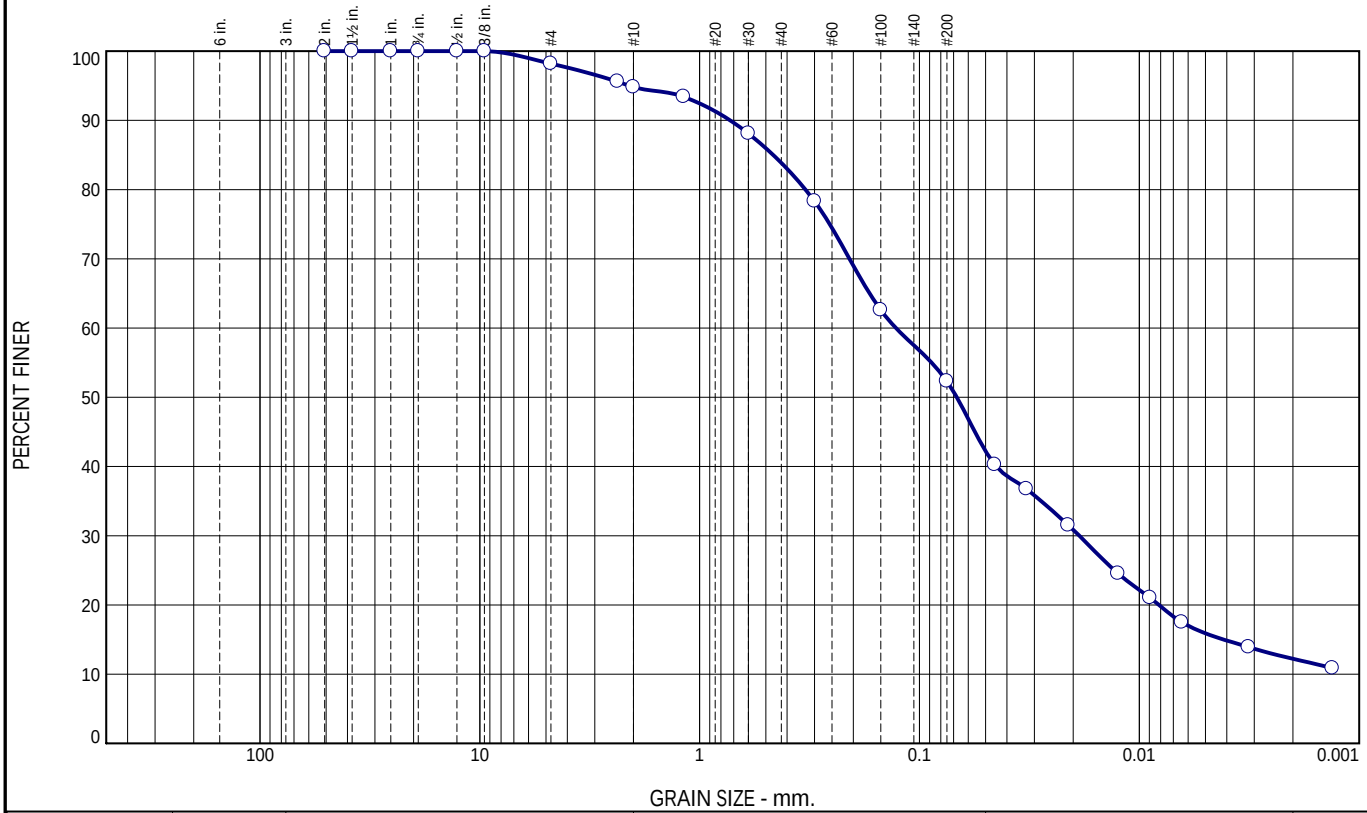
Client: Eco Source
Project: Metro Park West

Project No: 211566MPE Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Particle Size Distribution Report

ASTM D422



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0	0	0	2	3	3	6	12	17	15	11	19	12

Test Results (ASTM D422)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
2	100			
1.5	100			
1	100			
.75	100			
.5	100			
.375	100			
#4	98			
#8	96			
#10	95			
#16	93			
#30	88			
#50	78			
#100	63			
#200	52			
0.0454 mm.	40			
0.0326 mm.	37			
0.0210 mm.	32			
0.0125 mm.	25			
0.0089 mm.	21			
0.0064 mm.	18			
0.0032 mm.	14			
0.0013 mm.	11			

* (no specification provided)

Material Description

Light brown sandy silty clay

Atterberg Limits

PL= 16 LL= 28 PI= 12

Classification

USCS= CL AASHTO= A-6(3)

Test Remarks

Sampled by others.

Location: B-10
Sample Number: 122021E Depth: 8-10 ft Sample Date: 12/21/21

Construction Materials Testing

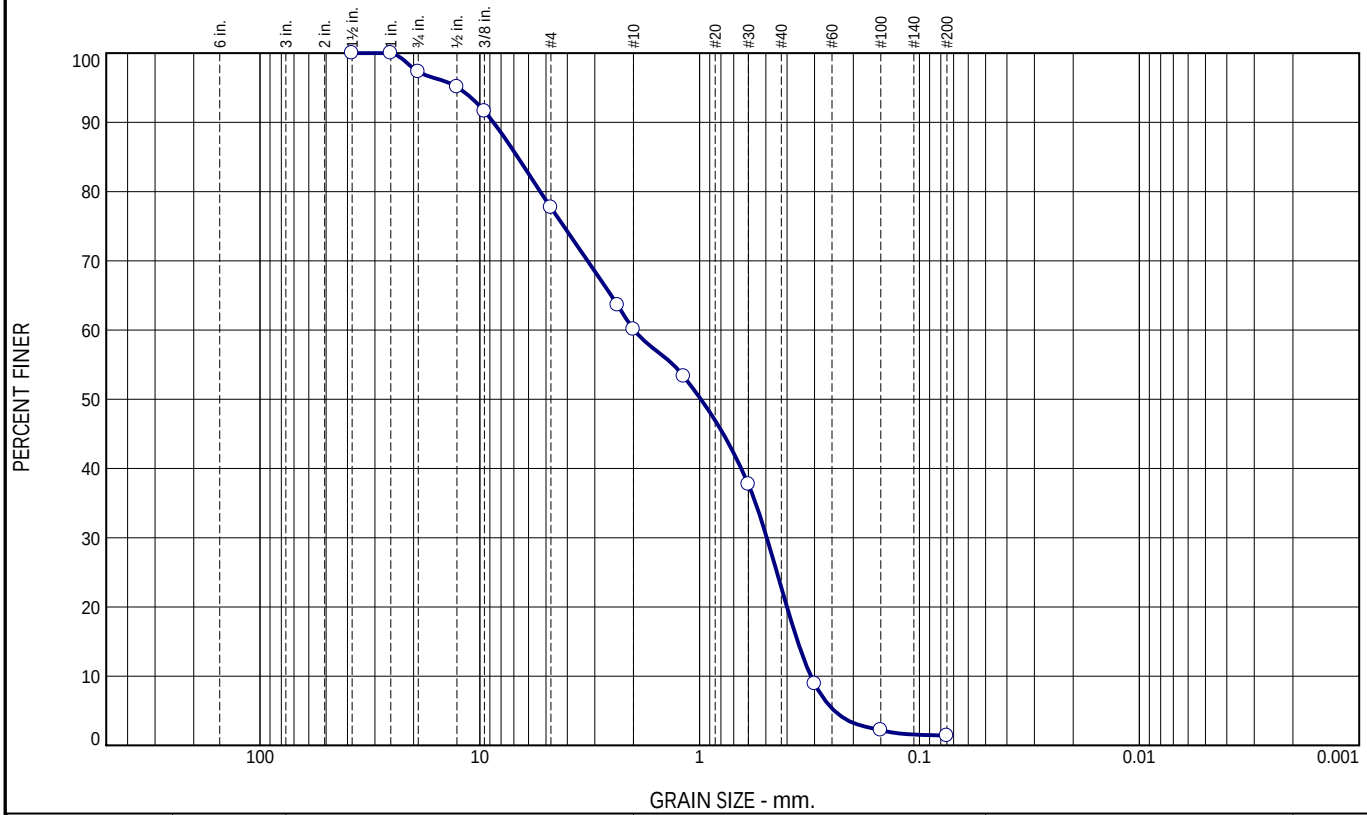
Client: Eco Source
Project: Metro Park West

Project No: 211566MPE Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Particle Size Distribution Report

ASTM D422



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0	0	3	19	18	10	20	25	3		2		

Test Results (ASTM D422)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
1.5	100			
1.0	100			
.75	97			
.5	95			
.375	92			
#4	78			
#8	64			
#10	60			
#16	53			
#30	38			
#50	9			
#100	2			
#200	1.4			

* (no specification provided)

Material Description

Brown fine to coarse sand

Atterberg Limits

PL= LL= PI=

Classification

USCS= SP AASHTO=

Test Remarks

Sampled by others.

Location: B-10
Sample Number: 122021F Depth: 17-19 ft Sample Date: 12/21/21

Construction Materials Testing

Client: Eco Source
Project: Metro Park West

Project No: 211566MPE Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Hydraulic Conductivity Test Data ASTM D5084

Project: Metro West Date: 1/19/2022

Client: Construction Materials Testing Job No.: 13571

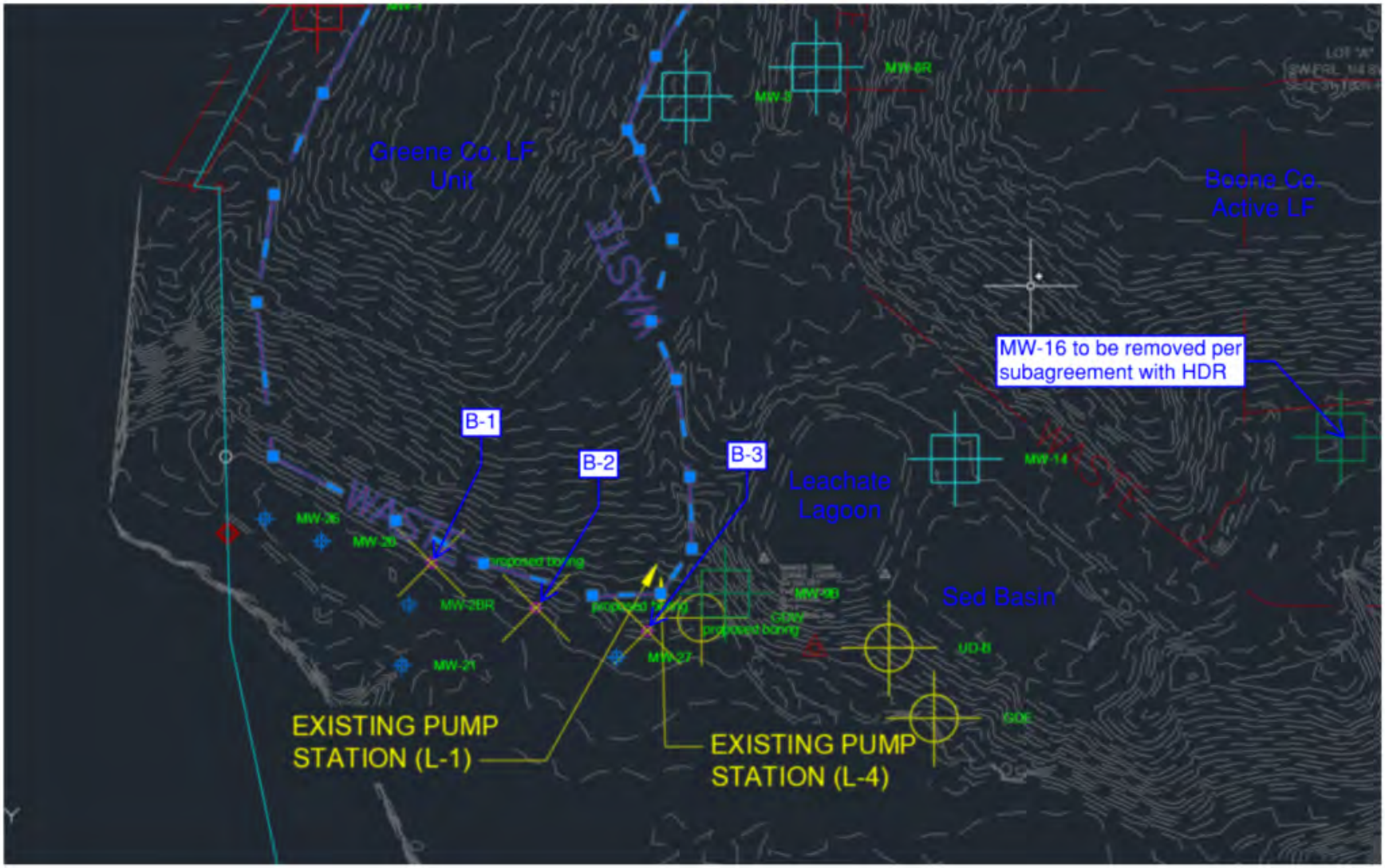
Boring No.:							
Sample No.:	B-3	B-5					
Depth (ft):	18-19.5	8-10					
Location:							
Sample Type:	Core	Core					
Soil Classification:	Sandy Lean Clay w/a little gravel (CL)	Sandy Lean Clay w/a little gravel (CL)					
Atterberg Limits Liquid Limit:							
Plastic Limit:							
Plasticity Index:							
Permeability Test	Intact Flex Wall	Intact Flex Wall					
Before Test Conditions Saturation %:							
Porosity:							
Height (in):	2.45	2.58					
Diameter (in):	2.89	2.88					
Dry Density (pcf):	122.6	118.0					
Water Content:	13.2%	15.2%					
Test Conditions Test Type:	Falling	Falling					
Max Head (ft):	5.0	5.0					
Confining press. (Effective-psi):	2.0	2.0					
Trial Numbers:	9-13	9-13					
Water Temp °C:	22.0	22.0					
Compaction:							
Saturation %:	100.4%	98.7%					
Coefficient of Permeability							
K @ 20 °C (cm/sec)	**3.3×10^{-8}**	**3.0×10^{-8}**					
K @ 20 °C (ft/min)	**6.4×10^{-8}**	**5.9×10^{-8}**					
Notes:							

9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Metro Park West



Soil Boring Log And Monitoring Well Construction Diagram for: B-1

Facility Name: Metro Park West Landfill - Perry, Iowa	Northing: 676951.01000	Easting: 1459071.99
Well Contractor Name: N/A	Drilling Method**: Direct Push	
Well Contractor Registration No: N/A	Boring Depth (ft) x Diameter (in): 25'	
Logged by: Cameron Lahn	Ground Surface Elevation (ASL): 947.25'	
Start Date: 12/20/2022 Finish Date: 12/20/2022	Top of Casing Elevation (ASL): -	

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0					100.0	CL	(0'-4') Brown Silty Sandy Clay (Trace Sand)
1					100.0		
2					100.0		
3					100.0		
4					100.0	CL	(4'-16') Dark Gray Silty Clay
5					100.0		
6					100.0		
7					100.0		
8					100.0		
9	Backfilled with bentonite upon completion →				100.0		
10					100.0		
11					100.0		
12					100.0		
13					100.0		
14					100.0		
15					100.0		
16					100.0	SC	(16'-20') Dark Gray Sandy Silt
17					100.0		
18					100.0		
19					100.0		
20		B-1	CC		100.0	CL	(20'-25') Dark Gray Silty Clay
21		B-1	CC		100.0		
22		B-1	CC		100.0		
23		B-1	CC		100.0		
24		B-1	CC		100.0		
25		B-1	CC		100.0		
26	**End of boring**						
27							
28							
29							
30							
31							

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	N/A	**Borehole Diameter:**	3.25"	**Location:**	MPW Landfill
Time:	N/A	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	N/A	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: B-2

Facility Name: Metro Park West Landfill - Perry, Iowa	Northing: 679603.62960	Easting: 1459182.155
Well Contractor Name: N/A	Drilling Method**: Direct Push	
Well Contractor Registration No: N/A	Boring Depth (ft) x Diameter (in): 29'	
Logged by: Cameron Lahn	Ground Surface Elevation (ASL): 945.61'	
Start Date: 12/20/2022 Finish Date: 12/20/2022	Top of Casing Elevation (ASL): -	

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0	Backfilled with bentonite upon completion →				100.0	ML	(0'-2') Dark Brown Silty Sandy Clay
1					100.0		
2					100.0		(2'-3') Wood Interference
3					100.0	CL	(3'-7') Gray Silty Clay
4					100.0		
5					100.0		
6					100.0		
7					100.0	CL	(7'-18') Dark Gray Silty Clay
8					100.0		Wet at 8'
9					100.0		
10					100.0		
11					100.0		
12					100.0		
13					100.0		
14					100.0		
15					100.0		
16					100.0		
17					100.0		
18					100.0	SM	(18'-22') Dark Gray Silty Sandy Clay
19					100.0		
20					100.0		
21					100.0		
22					100.0	SW	(22'-23') Sand
23					100.0	CL	(23'-26') Dark Gray Silty Clay
24					100.0		
25					100.0		
26		B-2	CC		100.0	CL	(26'-29') ~~Dark Gray Sandy Silty Clay~~ Gray fine-med sand
27		B-2	CC		100.0		(per lab results)
28		B-2	CC		100.0		
29		B-2	CC		100.0		
30	**End of boring**						
31							

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	N/A	**Borehole Diameter:**	3.25"	**Location:**	MPW Landfill
Time:	N/A	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	N/A	**Well Screen Size:**	-	**Project No.:**	10310518

Soil Boring Log And Monitoring Well Construction Diagram for: B-3

Facility Name: Metro Park West Landfill - Perry, Iowa	Northing: 679579.26600	Easting: 1459299.656
Well Contractor Name: N/A	Drilling Method**: Direct Push	
Well Contractor Registration No: N/A	Boring Depth (ft) x Diameter (in): 30'	
Logged by: Cameron Lahn	Ground Surface Elevation (ASL): 939.72'	
Start Date: 12/20/2022 Finish Date: 12/20/2022	Top of Casing Elevation (ASL): -	

Depth (feet)	Well Construction Details	Sample No.	Sample Type	Blow Count	Recovery (%)	USCS	Sample Descriptions: soil, color, classification, observation
0					100.0	ML	(0'-4') Brown with Rust Silty Sandy Clay
1					100.0		
2					100.0		
3					100.0		
4					100.0	CL	(4'-5') Gray Brown Silty Clay
5					5.0		(5'-10') NR
6					100.0		
7					100.0		Wet at 7'
8					100.0		
9	Backfilled with bentonite upon completion →				100.0		
10					100.0	CL	(10'-22') Dark Gray Silty Clay
11					100.0		
12					100.0		
13					100.0		
14					100.0		
15					100.0		
16					100.0		
17					100.0		
18					100.0		
19					100.0		
20					100.0		
21					100.0		
22					100.0	SW	(22'-22.5') Sand
23					100.0	CL	(22.5'-25') Dark Gray Silty Clay
24					100.0		27'
25		B-3	CC		100.0	SC	(25'-~~30'~~) Gray Sandy Silty Clay
26		B-3	CC		100.0		
27		B-3	CC		100.0		(27'-29')Dark Gray Sand
28		B-3	CC		100.0		
29		B-3	CC		100.0		
30		B-3	CC		100.0		
31	**End of boring**						

*** Sample Types:**
Split Spoon (SS)
Continuous Core (CC)

**** Drilling Method Options:**
Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)

Symbols to Use:
v – Static Water Level
s – sample collected

Observation Date:	N/A	**Borehole Diameter:**	3.25"	**Location:**	MPW Landfill
Time:	N/A	**Well Casing Diameter:**	-	**SLF Permit No.:**	80-SDP-03-84P
Static Water Level (ASL):	N/A	**Well Screen Size:**	-	**Project No.:**	10310518

January 12, 2023

Project No: 221571MWA

EcoSource, LLC
6424 University Ave
Windsor Heights, Iowa 50324

Re: **Geotechnical Laboratory Testing**
Metro Park West
Des Moines, Iowa

Dear Mr. Jordan Lowry:

As per your request, CMT has completed the laboratory testing for the above stated project. Enclosed you will find the results of the requested tests, as listed below.

Sample ID	Hydrometer Analysis, ASTM D422	Atterberg Limits, ASTM D4318	Permeability, ASTM D5084	Porosity, ή
B-1 20-25 ft	X	X	X	0.423
B-2 25-30 ft	X	X	X	0.358
B-3 10-15 ft	X	X	X	0.493

Tests were conducted in general accordance with ASTM test methods and procedures noted. Please feel free to call should you have questions or if I may be of further assistance.

Sincerely,

Sybil K. Ferrier, P.E.
Principal Engineer

JH/SF

1610 East Madison Ave. • Des Moines, Iowa 50313
(515) 263-0794 • Fax (515) 263-0851
www.cmt-iowa.com

APPENDIX

1610 East Madison Ave • Des Moines, Iowa 50313
(515) 263-0794 • Fax (515) 263-0851
www.cmt-iowa.com

GENERAL NOTES - BORING LOG DESCRIPTIONS

Soil descriptions stated on the Boring Logs are based on the Unified Soil Classification System as stated in ASTM Designations D-2487 and D-2488. The Unified Soil Classification group symbol listed in the table below correlate to the group symbols listed on the Boring Logs. The classification is mainly based on visual observations to define the soil characteristics. If a more detailed soil description is required, additional soil testing will be conducted to better define the soil characteristics.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
SW	Well-graded Sand	GW	Well-graded Gravel	CL	Lean Clay	CH	Fat Clay
SP	Poorly-graded Sand	GP	Poorly-graded Gravel	ML	Silt	MH	Elastic Silt
SM	Silty Sand	GM	Silty Gravel	OL or OH	Organic Silt Organic Clay	Pt	Peat
SC	Clayey Sand	GC	Clayey Gravel				

RELATIVE DENSITY OF COARSE-GRANED SOILS		**CONSISTENCY OF FINE-GRAINED SOILS**		
SPT, bpf	*Relative Density*	*Unconfined Compressive Strength, Q_u, psf*	*Consistency*	*SPT, bpf*
0-3	Very Loose	< 500	Very Soft	0 – 2
4-9	Loose	500 - 1,000	Soft	2 – 4
10-29	Medium Dense	1,001 - 2,000	Medium Stiff	4 – 8
30-49	Dense	2,001 – 4,000	Stiff	8 – 15
50-80	Very Dense	4,001 – 8,000	Very Stiff	15 – 30
80+	Extremely Dense	8,001 – 16,000	Hard	30 – 100
		>16,000	Very Hard	>100

GRAIN SIZE TERMINOLOGY		**RELATIVE PROPORTIONS**		
Major Component of Sample	*Size Range*	*Descriptive Terms(s) (of components also present in sample)*	*Fines Percent of Dry Weight*	*Sand and Gravel Percent of Dry Weight*
Cobbles	12 in. to 3 in. (300 mm to 75 mm)	Trace	< 5	< 15
Gravel	3 in. to #4 sieve (75 mm to 4.75 mm)	With	5 – 12	15 – 29
Sand	#4 to #200 sieve (4.75 mm to 0.074 mm)	Modifier	> 12	> 30
Silt or Clay	Passing #200 sieve (> 0.074 mm)			

DRILLING AND SAMPLING ABBREVIATIONS

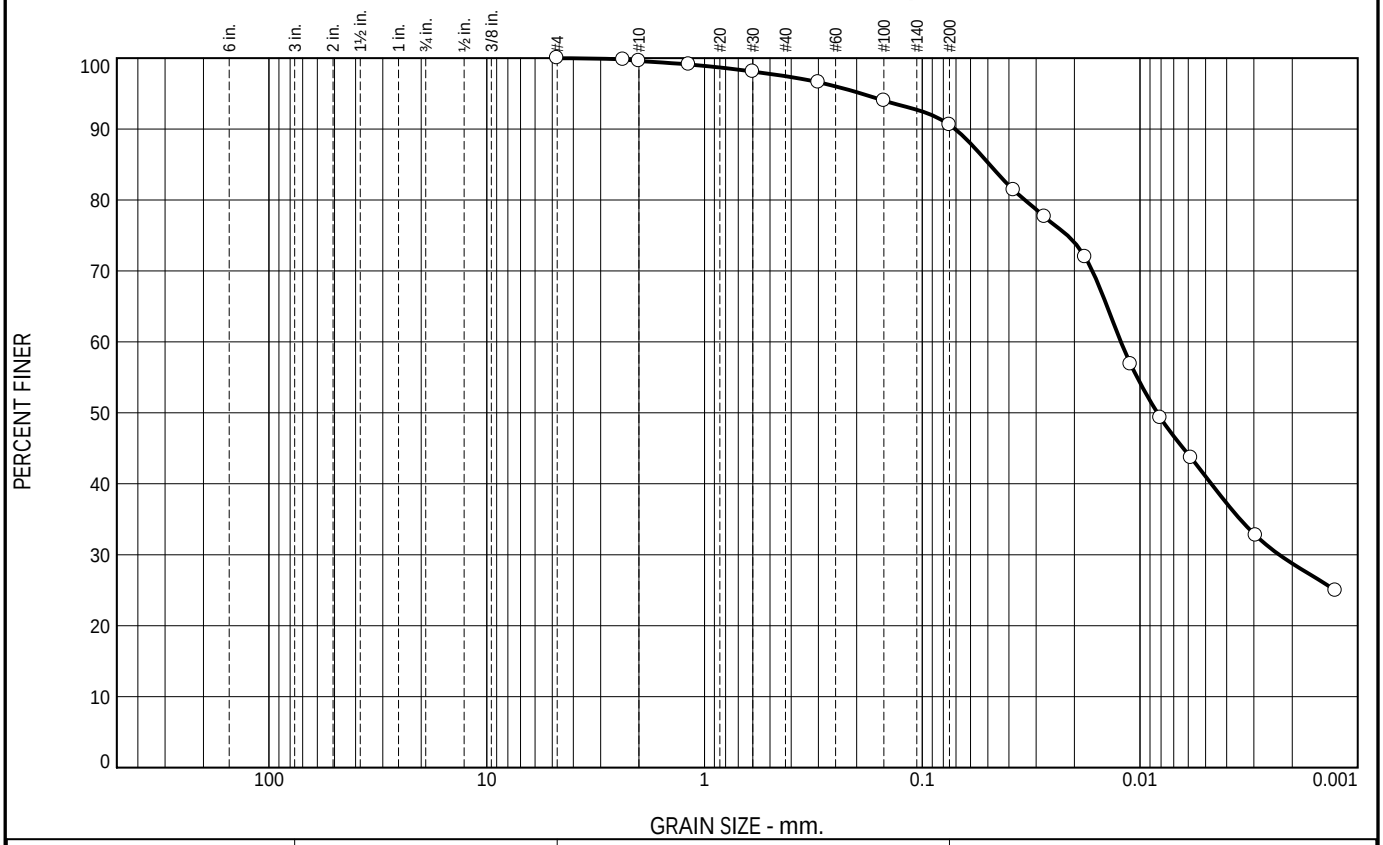
Drilling Methods

CFA – Continuous Flight Auger; typically, 4, 6, or 8 inches in diameter (ASTM D 1452)
HSA – Hollow Stem Auger; 6 or 8 inches in diameter, continuous flight auger remains in bore hole with undisturbed soil samples obtained from center of auger.
HA – Hand Auger; typically with a 4 inch or less diameter auger

Sample Types

SS - Split Spoon; samples obtained with a 140 lb manual hammer in accordance with ASTM D1586.
SSA – Split Spoon; samples obtained with a 140 lb automatic hammer in accordance with ASTM D 1586.
ST – Shelby Tube; thin walled tube samples, typically for cohesive soils, in accordance with ASTM D1587.
SPT- Standard Penetration Test: The number of blows required to drive a sampler, either split spoon or drive cone, into the soil with a 140 lb mass dropped a distance of 30 inches, in accordance with ASTM D 1586, and the number of blows are recorded in each 6 inch interval over a distance of 18 inches. Blow counts are reported for each 6 inch interval or the sum of the last two intervals is reported. The sum of the last two intervals is referred to as N, in blows per foot.
BS – Bulk Disturbed Sample
CPT – Cone Penetration Test; A device in which a 60° cone is pushed continuously into the soil and the cone end resistance is measured for skin friction and end bearing (ASTM D3441).

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	2.1	6.9	61.8	28.8

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.8		
#10	99.6		
#16	99.1		
#30	98.1		
#50	96.6		
#100	94.0		
#200	90.6		
0.0381 mm.	81.4		
0.0275 mm.	77.6		
0.0179 mm.	72.0		
0.0111 mm.	56.9		
0.0081 mm.	49.3		
0.0058 mm.	43.7		
0.0029 mm.	32.7		
0.0013 mm.	25.0		

* (no specification provided)

Soil Description

Dark grayish brown silty clay trace sand

Atterberg Limits

PL= 22 LL= 46 PI= 24

Coefficients

D_{90}= 0.0707 D_{85}= 0.0491 D_{60}= 0.0122
D_{50}= 0.0083 D_{30}= 0.0023 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(24)

Remarks

Sampled by others.

Location: B-3
Sample Number: 1 Depth: 10 - 15 FT Date: 12/27/22

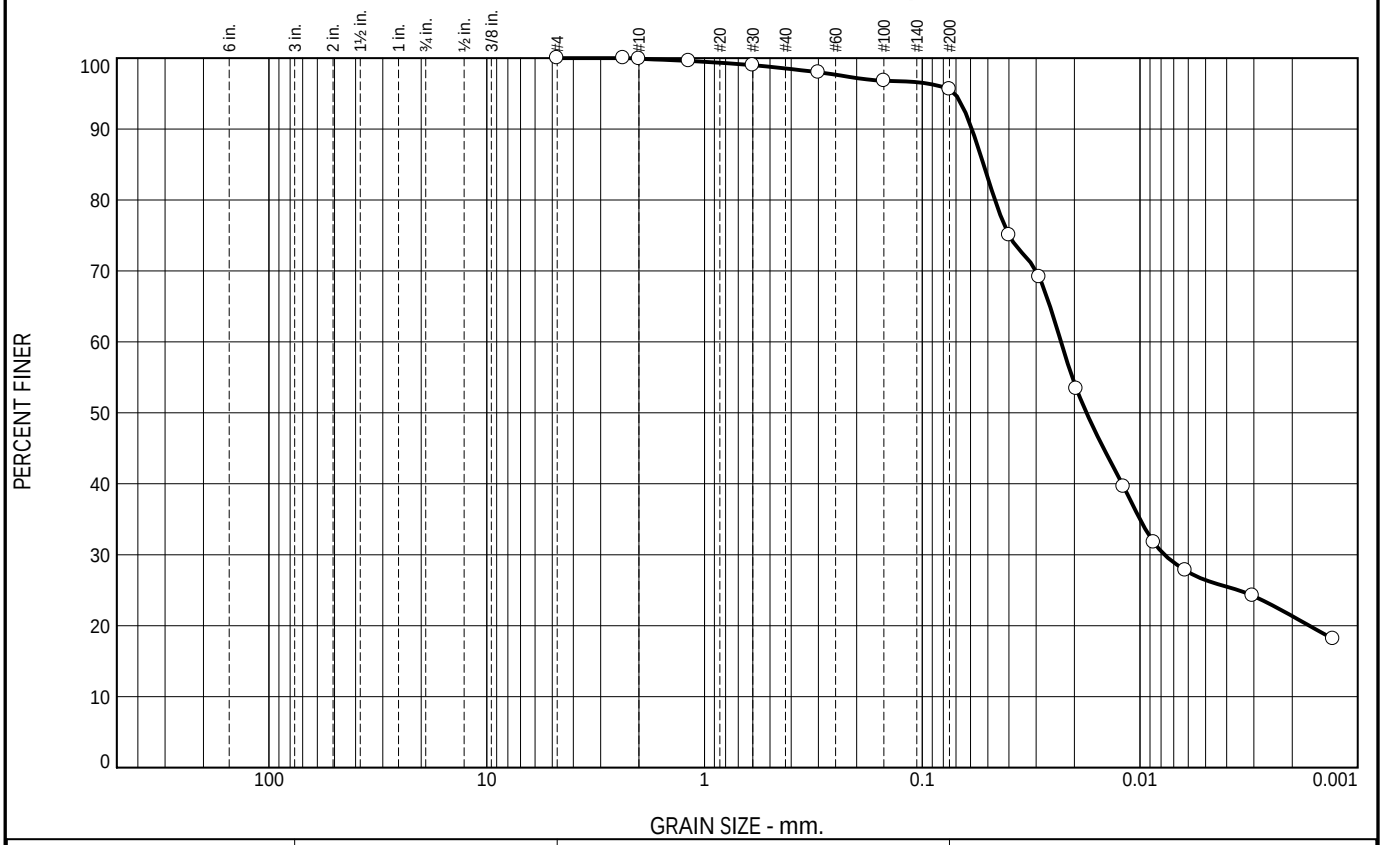
Construction Materials Testing

Client: EcoSource, LLC.
Project: Metro Waste Authority

Project No: 221571MWA Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.4	2.9	74.3	21.3

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#10	99.9		
#16	99.6		
#30	99.0		
#50	98.0		
#100	96.8		
#200	95.6		
0.0400 mm.	75.1		
0.0290 mm.	69.1		
0.0196 mm.	53.4		
0.0119 mm.	39.6		
0.0087 mm.	31.8		
0.0062 mm.	27.8		
0.0030 mm.	24.2		
0.0013 mm.	18.1		

* (no specification provided)

Soil Description

Gray very silty clay trace sand

Atterberg Limits

PL= 22 LL= 36 PI= 14

Coefficients

D_{90}= 0.0592 D_{85}= 0.0523 D_{60}= 0.0231
D_{50}= 0.0176 D_{30}= 0.0077 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(14)

Remarks

Sampled by others.

Location: B-1
Sample Number: 2 Depth: 20 - 25 FT Date: 12/27/22

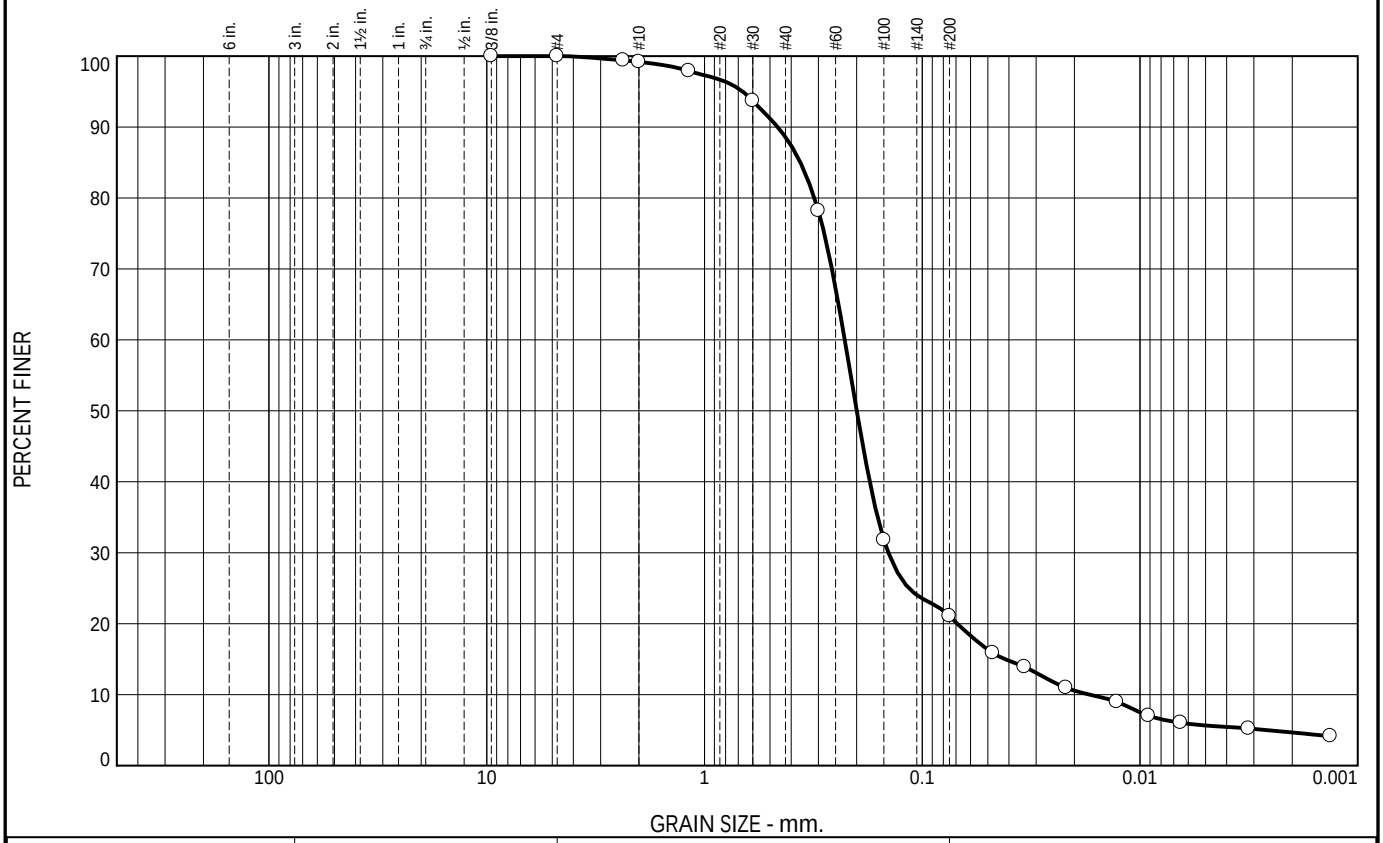
Construction Materials Testing

Client: EcoSource, LLC.
Project: Metro Waste Authority

Project No: 221571MWA Figure

Tested By: J.Hopkins Checked By: S.Ferrier

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.8	10.6	67.5	16.4	4.7

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	100.0		
#8	99.4		
#10	99.2		
#16	97.9		
#30	93.7		
#50	78.2		
#100	31.8		
#200	21.1		
0.0474 mm.	15.9		
0.0339 mm.	13.9		
0.0219 mm.	11.0		
0.0128 mm.	9.0		
0.0091 mm.	7.0		
0.0065 mm.	6.0		
0.0032 mm.	5.2		
0.0013 mm.	4.2		

* (no specification provided)

Soil Description

Gray fine to medium sand trace silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.4607 D_{85}= 0.3630 D_{60}= 0.2269
D_{50}= 0.1998 D_{30}= 0.1430 D_{15}= 0.0417
D_{10}= 0.0170 C_u= 13.32 C_c= 5.29

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sampled by others.

Location: B-2
Sample Number: 2 Depth: 25 - 30 FT Date: 12/27/22

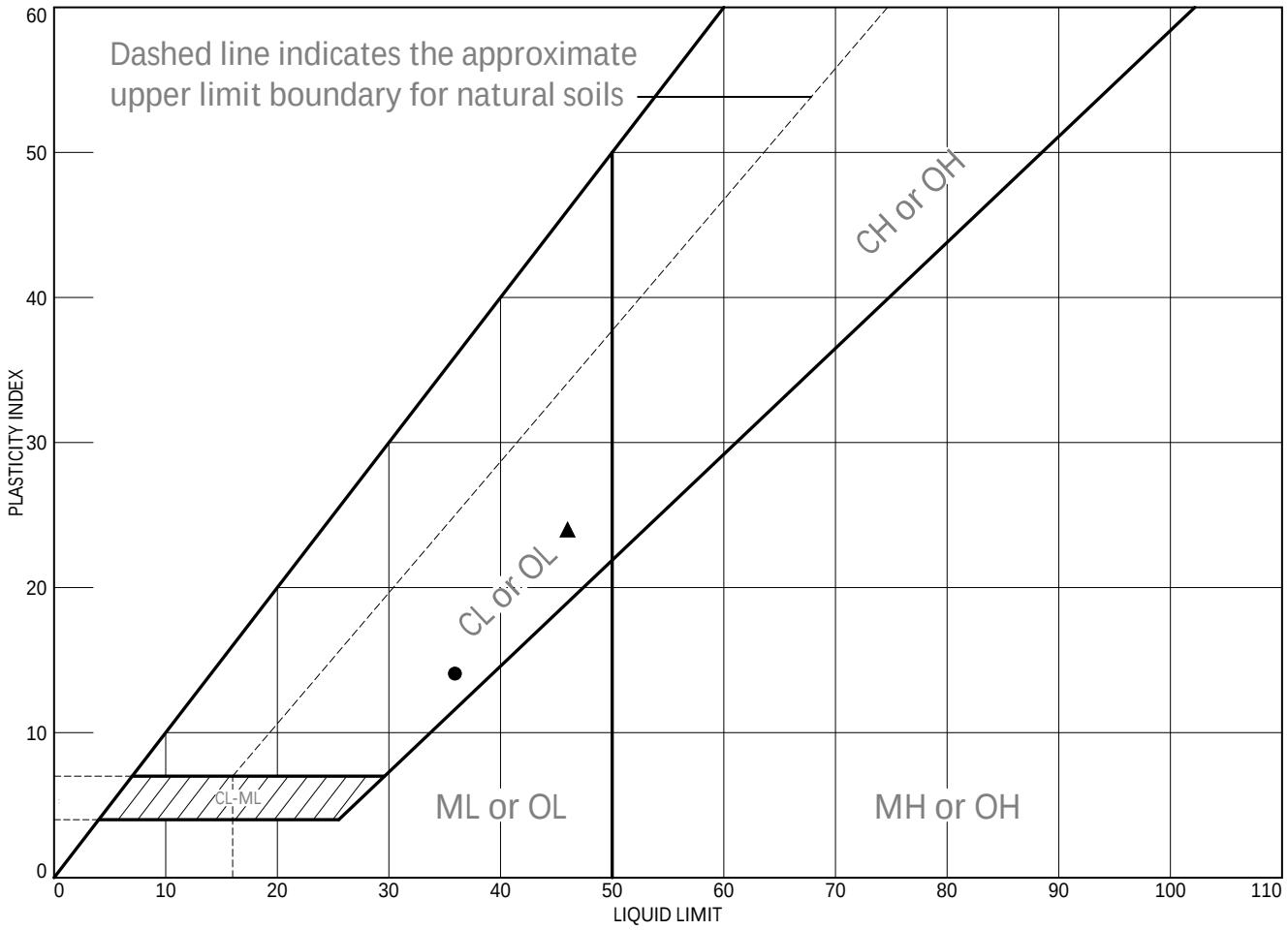
Construction Materials Testing

Client: EcoSource, LLC.
Project: Metro Waste Authority

Project No: 221571MWA Figure

Tested By: J.Hopkins Checked By: S.Ferrier

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray very silty clay trace sand	36	22	14	98.5	95.6	CL
■	Gray fine to medium sand trace silt	NV	NP	NP	88.6	21.1	SM
▲	Dark grayish brown silty clay trace sand	46	22	24	97.5	90.6	CL

Project No. 221571MWA Client: EcoSource, LLC.

Project: Metro Waste Authority

●Location: B-1 Depth: 20 - 25 FT Sample Number: 2

■Location: B-2 Depth: 25 - 30 FT Sample Number: 2

▲Location: B-3 Depth: 10 - 15 FT Sample Number: 1

Remarks:

●As received moisture content - 22.5%

■As received moisture content - 20.2%

▲As received moisture content - 33.8%

Figure

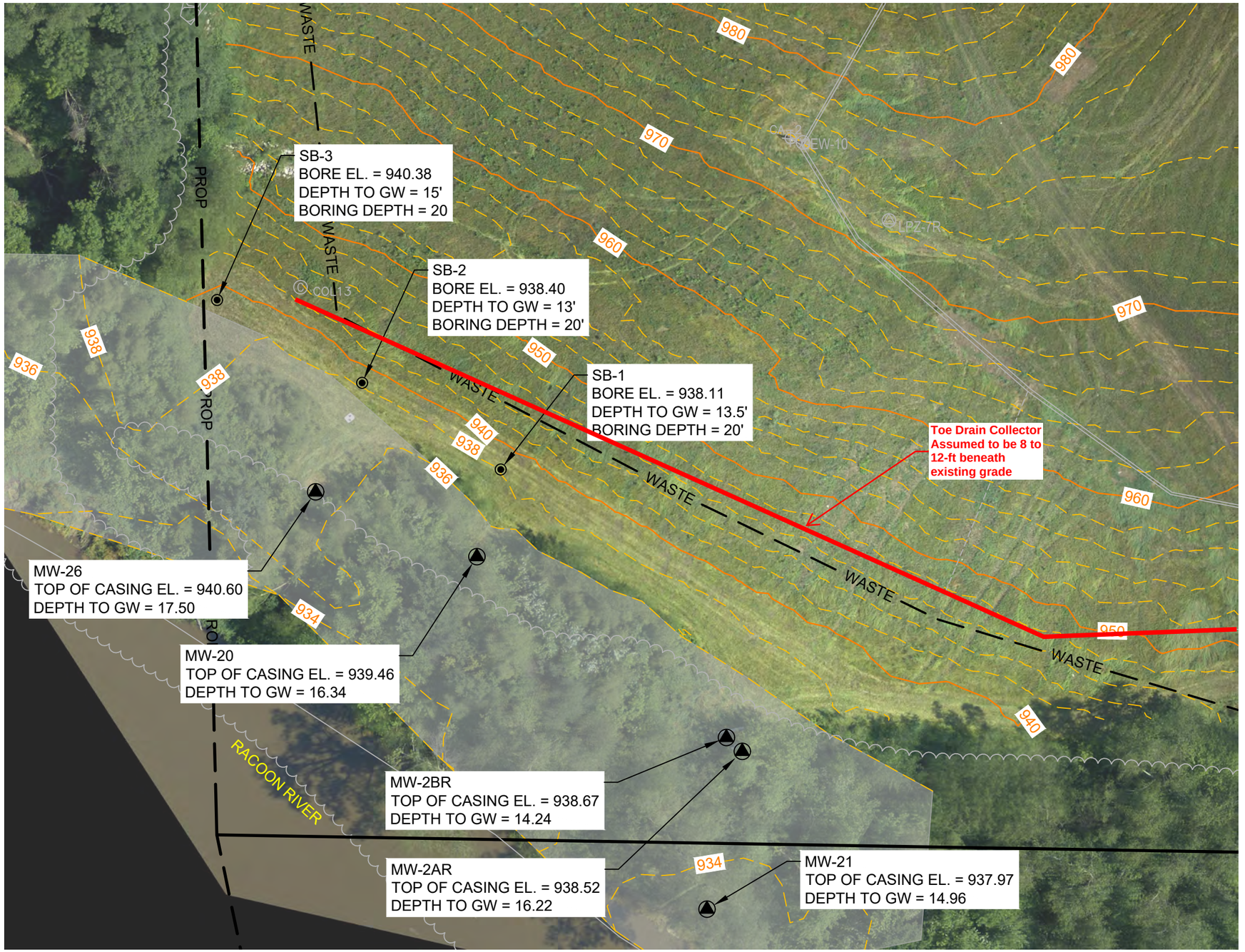
Tested By: D.Tarnow Checked By: S.Ferrier

Hydraulic Conductivity Test Data ASTM D5084

Project: Metro Waste Date: 1/9/2023

Client: Construction Materials Testing Job No.: 14205

Boring No.:		B-1	B-2	B-3				
Sample No.:								
Depth (ft):		20-25	20-25	10-15				
Location:								
Sample Type:		Core	Core	Core				
Soil Classification:		Lean Clay w/lenses and laminations of silt (CL)	Fine to Medium Sand (SM)	Lean Clay slightly organic (CL)				
Atterberg Limits	Liquid Limit:							
	Plastic Limit:							
	Plasticity Index:							
Permeability Test		Intact Flex Wall	Intact Flex Wall	Intact Flex Wall				
Before Test Conditions	Saturation %:							
	Porosity:							
	Height (in):	2.39	1.96	1.92				
	Diameter (in):	1.65	1.44	1.37				
	Dry Density (pcf):	96.6	110.6	84.8				
	Water Content:	25.2%	20.2%	20.2%				
Test Conditions	Test Type:	Falling	Falling	Falling				
	Max Head (ft):	5.0	5.0	5.0				
	Confining press. (Effective-psi):	2.0	2.0	2.0				
	Trial Numbers:	7-11	7-11	7-11				
	Water Temp °C:	22.0	22.0	22.0				
	Compaction:							
	Saturation %:	96.2%	96.1%	96.1%				
Coefficient of Permeability								
K @ 20 °C (cm/sec)		**3.2×10^{-8}**	**3.5×10^{-4}**	**3.1×10^{-7}**				
K @ 20 °C (ft/min)		**6.2×10^{-8}**	**6.9×10^{-4}**	**6.1×10^{-7}**				
Notes:								



LEGEND

AREA OF ASSUMED GRADE OUTSIDE OF JUNE 2021 SURVEY.

LEGEND

1. EXITING CONTOURS ARE A COMBINATION OF AERIAL SURVEY PROVIDED BY AEROVIEW SERVICES, DATED JUNE 30, 2021 AND ASSUMED GRADE CONTINUATION TOWARDS RACOON RIVER BANK.

N

40 0 40 80

SCALE IN FEET

Metro Waste Authority

METRO WASTE AUTHORITY
METRO PARK WEST

PHYTOREMEDIATION ANALYSIS

DATE
JULY 2022

FIGURE
1

Soil Boring Log And Monitoring Well Construction Diagram for: SB-1 (East)

Facility Name: Metro Park West Landfill		X Coordinates: 41.863643	Y Coordinates: -94.166123
Well Contractor Name: Jordan Lowry		Drilling Method**: Direct Push	
Well Contractor Registration No: 12145		Boring Depth (ft) x Diameter (in): 20' x 2.0'	
Logged by: Kris Sommer		Ground Surface Elevation (ASL): -	
Start Date: 6/8/2021	Finish Date: 6/8/2021	Top of Casing Elevation (ASL): -	

Depth (feet)	Well Construction Details	Sample No.	Sample Type*	PID/FID (PPM)	USCS	Sample Descriptions: soil, color, classification, observation
0		1	CC			(0"-3") Grass and Root Zone
1				0.0	MH CL SP	(3"-1') Dark Brown Silty Clay with Trace Sand
2				0.0	SP	(1'-2') Brown Sand
3				0.0	MH CL	(2'-3') Dark Brown, Dark Gray Silty Clay
4				0.0	MH CL	(4'-7') Gray Silty Clay
5		2	CC	0.0		
6	←			0.0		
7	Backfilled with bentonite upon completion			0.0	SP MH CL	(7'-12') Dark Brown Sandy Silty Clay
8				0.0		
9				0.0		
10		3	CC	0.0		
11				0.0		
12				0.0	SW CL	(12'-15') Dark Brown Fine Sandy Clay
13				0.0		(v 13.5) Groundwater Encountered During Sampling Activities
14				0.0		
15		4	CC	0.0	SP	(15-16') Brown Sand
16				0.0	SW	(16'-17) Gray Fine Sand
17				0.0		
18				0.0		
19				0.0	CH SP	(19'-20') Gray Clay with Trace Sand
20	**End of boring**	5	CC	0.0		
21						
22						
23						
24						
25						

* Sample Types:	** Drilling Method Options:	Symbols to Use:
Split Spoon (SS) Continuous Core (CC)	Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)	v – Static Water Level s – sample collected

Observation Date:	-								
Time:	-								
Static Water Level (ASL):	-								

Soil Boring Log And Monitoring Well Construction Diagram for: SB-2 (Central)

Facility Name: Metro Park West Landfill	X Coordinates: 41.863730	Y Coordinates: -94.166312
Well Contractor Name: Jordan Lowry	Drilling Method**: Direct Push	
Well Contractor Registration No: 12145	Boring Depth (ft) x Diameter (in): 20' x 2.0'	
Logged by: Kris Sommer	Ground Surface Elevation (ASL): -	
Start Date: 6/8/2021 Finish Date: 6/8/2021	Top of Casing Elevation (ASL): -	

Depth (feet)	Well Construction Details	Sample No.	Sample Type*	PID/FID (PPM)	USCS	Sample Descriptions: soil, color, classification, observation
0		1	CC			(0"-3") Grass and Root Zone
1				0.0	SP MH CL	(3"-4') Brown Sandy Silty Clay
2				0.0		
3				0.0		
4				0.0	SP CH	(4'-5') Gray Brown Sandy Clay
5		2	CC	0.0	SP CH	(5'-7') Dark Brown Sandy Clay
6	← Backfilled with bentonite upon completion			0.0		
7				0.0	CL CH	(7'-19') Dark Brown Clay
8				0.0		
9				0.0		
10		3	CC	0.0		
11				0.0		
12				0.0	SW CL	(12'-15') Dark Brown Fine Sandy Clay
13				0.0		(v 13.0) Groundwater Encountered During Sampling Activities
14				0.0		
15		4	CC	0.0	SP	(15-16') Brown Sand
16				0.0	SW	(16'-17) Gray Fine Sand
17				0.0		
18				0.0		
19				0.0	SP	(19'-20') Brown Sand
20	**End of boring**	5	CC	0.0		
21						
22						
23						
24						
25						

* Sample Types:	** Drilling Method Options:	Symbols to Use:
Split Spoon (SS) Continuous Core (CC)	Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)	v – Static Water Level s – sample collected

Observation Date:	-									
Time:	-									
Static Water Level (ASL):	-									

Soil Boring Log And Monitoring Well Construction Diagram for: SB-3 (West)

Facility Name: Metro Park West Landfill	X Coordinates: 41.863813	Y Coordinates: -94.166510
Well Contractor Name: Jordan Lowry	Drilling Method**: Direct Push	
Well Contractor Registration No: 12145	Boring Depth (ft) x Diameter (in): 20' x 2.0'	
Logged by: Kris Sommer	Ground Surface Elevation (ASL): -	
Start Date: 6/8/2021 Finish Date: 6/8/2021	Top of Casing Elevation (ASL): -	

Depth (feet)	Well Construction Details	Sample No.	Sample Type*	PID/FID (PPM)	USCS	Sample Descriptions: soil, color, classification, observation
0		1	CC			(0"-3") Grass and Root Zone
1				0.0	MH CL	(3"-1') Brown Silty Clay
2				0.0	SW	(1'-2') Light Brown Sand
3				0.0	MH CL SP	(2'-3') Brown Silty Clay Trace Sand
4				0.0	SP CH	(3'-8') Gray Brown Sandy Clay
5		2	CC	0.0		
6	← Backfilled with bentonite upon completion			0.0		
7				0.0		
8				0.0	MH CL	(8'-16') Brown Rust Silty Clay
9				0.0		
10		3	CC	0.0		
11				0.0		
12				0.0		
13				0.0		
14				0.0		
15		4	CC	0.0	SW	(16'-19') Gray Sand
16				0.0		(v 15') Groundwater Encountered During Sampling Activities
17				0.0		
18				0.0		
19				0.0	CH SP	(19'-20') Gray Clay with Trace Sand
20	**End of boring**	5	CC	0.0		
21						
22						
23						
24						
25						

* Sample Types:	** Drilling Method Options:	Symbols to Use:
Split Spoon (SS) Continuous Core (CC)	Rotary Auger, Push Probe, Hand Auger, Air drilling, Hollow Stem Auger, Other (Describe)	v – Static Water Level s – sample collected

Observation Date:	-									
Time:	-									
Static Water Level (ASL):	-									