Project Manual

Shenandoah County Landfill
Phase 4 Construction

Shenandoah County Landfill
Department of Solid Waste Management
349 Landfill Road
Edinburg, Virginia 22824
540-984-8573

SCS ENGINEERS

02201010.02 | May 29, 2020

11260 Roger Bacon Drive
Reston, VA 20190
703-471-6150

DOCUMENT 00010

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SECTION 00020

County of Shenandoah
600 N. Main Street, Suite 102
Woodstock, Virginia 22664

May 29, 2020

INVITATION TO BID

INVITATION TO BID NUMBER: 2020-002

PROPOSAL ISSUING DATE: June 1, 2020

PROPOSAL CLOSING DATE: June 29, 2020

SUBJECT: Shenandoah County Landfill Phase 4 Construction

To whom it may concern:

Sealed bids for the supply of the goods and services fully described in the enclosed Contract Specifications will be accepted until June 29, 2020 at 2:00 P.M., and publicly opened and read on June 29, 2020 at 2:00 P.M.

Bids must be prepared in complete conformance with the enclosed Bid Information and Requirements form, which is hereby incorporated into this invitation. Failure to meet any standard set forth in the Bid Information and Requirements Form ("BIRF") may result in rejection of the bid. The enclosed BIRF is hereby incorporated in and made a part of this invitation to bid.

A mandatory pre-bid meeting is scheduled for Monday, June 8, 2020 at 2:00 pm at the Shenandoah County landfill office 349 Landfill Road, Edinburg, VA 22824. Attendance at the pre-bid meeting is a prerequisite to submitting a bid.

Any questions concerning the project should be submitted via e-mail to Mr. Patrick Felling, Director of Solid Waste, pfelling@shenandoahcountyva.us. Questions shall be submitted no later than 5:00 pm on June 19th.

Unless a greater percentage is specified elsewhere in the contract documents, up to five percent of any sum due may be retained by the County to assure faithful performance of the contract. All retainage will be paid to the contractor with the last payment. ***If*** the contract exceeds $200,000 ***and*** it relates to the construction of highways, roads, streets, bridges, parking lots, demolition, clearing, grading, excavating, paving, pile driving, miscellaneous drainage structures, or the installation of water, gas, sewer lines or pumping stations, the contractor may elect to have the retainage paid into an escrow account.

Bidders must provide a bid bond equal to 5% of the amount of their bid with their bids, in accordance with the BIRF which is enclosed. Alternatively, bidders may provide a certified check, cashier's check, or cash escrow in the face amount required for the bond.

Successful bidders must provide a Performance Bond and a Labor and Material Payment Bond in accordance with the BIRF. Alternatively, bidders may provide a certified check, cashier's check, or cash escrow in the face amount required for the bond.

Any bidder, upon request, shall be afforded the opportunity to inspect bid records within a reasonable time after the opening of all bids but prior to award, except in the event that the County decides not to accept any of the bids and to reopen the contract.

Prices quoted in bids must be held firm for thirty (30) days after the date set for the opening of the bid to allow the County time to process and award contract(s).

Very truly,

Evan Vass
County Administrator

SECTION 00100

SHENANDOAH COUNTY, VIRGINIA

BID INFORMATION AND REQUIREMENTS

1. **General:**

   a. This document will form part of the contract between the successful bidder and the County. The terms of this document are subject to the Invitation to Bid ("ITB"), which shall control in the event of conflict.

   b. Sealed bids subject to the conditions, specifications, and instructions below and on the attached sheets hereto, will be received in person at the County's Administration Office, 600 North Main Street, Suite 102, Woodstock, Virginia, 22664, until the time and date specified in the ITB. If the ITB so indicates, bids may also be transmitted by email.

   c. Bids concerning separate bid invitations must not be combined on the same form or placed in the same envelope. Bids submitted in violation of this provision risk not being considered.

   d. The Bid Documents may be obtained electronically by visiting the County's website at www.shenandoahcountyva.us and view "Invitations to Bid" under "Businesses". A hard copy of Bid Documents may be obtained by providing a written request and $100.00 non-refundable fee to SCS Engineers, Attn: Ken Armentrout, 11260 Roger Bacon Drive, Reston, Virginia 20190.

   e. Owner and Engineer, in making copies of Bidding Documents, 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. **Contents of Bids:**

   a. All bids must be signed in order to be considered. If the bidder is a firm or corporation, the bidder should show the title of the individual executing the bid, and if the individual is not an officer of the firm or corporation, the bidder should submit proof that the individual has the authority to bind the firm or corporation.

   b. Unless the ITB or specifications expressly provide otherwise, where a brand or trade name appears in the specifications, it is understood that the brand or trade name referred to, or its equivalent, shall be furnished. If the bidder proposes equivalent but not identical items, the bidder must furnish descriptive literature and full particulars for review, so that the County may assure equivalence of items.

c. Samples of items, if requested, shall be furnished by the bidder without charge. Upon request, within sixty days after the date set for opening the bids, the samples will be returned at the bidder's expense. Otherwise samples may be destroyed or consumed.

d. Time of proposed delivery shall be stated in number of calendar days. General terms such as "stock," "immediately," and "as soon as possible," may be cause for rejection. Unless otherwise specified, quote the earliest delivery date as it may be considered a factor in making an award.

e. All erasures, interpolations, and other changes in the bid should be signed or initialed by the bidder. Bids containing any conditions, omissions, erasures, alterations, or items not called for in the proposal, may be rejected by the County as being incomplete.

f. Unless a lump sum price is specifically requested, unit and extended prices should also be given. Failure to do so may cause a bid not to be considered. In case of error in extension of prices in the bid, the unit price shall govern.

g. Bids based on a firm price or those including a “downward escalator” clause may be given preference over lower ones bearing an “escalator” clause.

h. Bidder shall submit with the bid descriptive literature of the commodities, equipment, materials, supplies or services which he or she proposes to furnish, if such articles are produced by a different manufacturer than those specified.

i. The bid, the bid security, if any, and any other documents required, should be enclosed in a sealed opaque envelope.

3. **Bidder's Representations:**

a. Each bidder, by submitting a bid in response to this invitation to bid, represents that the bidder has read and understands the contract specifications and has familiarized himself with all federal, state and local laws, ordinances, rules and regulations that in any manner may affect the cost, progress or performance of the work.

b. The failure or omission of any bidder to receive or examine any form, instrument, addendum or other documents, or to acquaint himself with conditions existing at the site, shall in no way relieve any bidder from any obligations with respect to his bid or to the contract.

4. **Contractor's Registration:**

Construction contractors are referred to Chapter 11 of Title 54.1 of the Code of Virginia, concerning residency issues, licensing issues, and evidence of licensure. They shall submit proper evidence of their registration prior to the consideration of bids.

5. **Addenda:**

a. If any party contemplating the submission of a bid on this invitation is in doubt as to the meaning of any part of the plans, specifications or other documents, he should submit a written request for an interpretation thereof to the County. Typically, an interpretation of the contract specifications will be made by addendum duly issued to each party receiving invitation to bid. Addenda will be available at the County offices for review by any interested party. THE COUNTY SHALL NOT BE RESPONSIBLE FOR EXPLANATIONS OR INTERPRETATIONS OF CONTRACT SPECIFICATIONS, EXCEPT AS ISSUED BY ADDENDUM.

b. Any changes to the ITB or contract specifications shall be in the form of a written addendum from the County which shall be signed by the County Administrator or any duly authorized representative.

c. To the extent practicable, all addenda will be issued no later than four calendar days prior to the date set for the receipt of bids except an addendum extending the date for the receipt of bids or an addendum withdrawing the invitation to bid.

d. Each bidder shall be responsible for determining that all addenda issued by the County for the ITB have been received before submitting a bid proposal for the work.

e. Each bidder should acknowledge the receipt of each addendum in his bid.

f. Unless otherwise instructed by a potential bidder, the County will issue addenda by email, wherever practicable. If the County does not know a potential bidder's email address, or if email transmission is impracticable, the County may use any other method of delivery reasonably calculated to result in timely delivery to potential bidders.

6. **Taxes:**

a. The successful bidder shall pay all Town, County, State, and Federal taxes. Such taxes shall not be in addition to the contract price between the County and the successful bidder, as the taxes shall be an obligation of the successful bidder and not of the County, and the County shall be held harmless for same by the successful bidder.

7. **Building Inspection Fees:**

It is the responsibility of the successful bidder to secure all required permits to perform work in Shenandoah County. If a permit is required from the Shenandoah County Building Inspection Department as required by code, no fee will be assessed and it should not be included as an additional cost of this bid.

8. **Submission of Bids:**

a. All bidders should use the form provided, if any, in submitting their bids.

b. The envelope containing the bid should be sealed and marked in the lower left-hand corner with the invitation to bid number, commodity, and due date of the bid. Additional copies of bids should be enclosed in the same envelope as the original bid.

c. If a bid contains proprietary information or trade secrets, such information must be submitted in a separate sealed and resealable envelope, and clearly marked as such.

d. Where email bids are allowed, these provisions shall be followed as closely as practicable.

9. **Bid Security:**

a. If the bidder is required to furnish a bid bond by the invitation to bid, or if the bid is for a construction contract in excess of $500,000, bidder shall obtain a bid bond from a surety company authorized to do business in Virginia as a guarantee that if the contract is awarded to the bidder, the bidder will enter into the contract for the work described in the bid at the bid price. Alternatively, the bidder may provide a certified check, cashier's check, or cash escrow in the face amount required for the bond.

10. **Modification of Bid:**

a. A bid may be modified or withdrawn by the bidder anytime prior to the time and date set for the receipt of bids. The bidder shall notify the County, in writing of his intentions.

b. Modified and withdrawn bids may be resubmitted to the County up to the time and date set for the receipt of bids.

c. No bid can be withdrawn after the time set for the receipt of bids and for sixty days thereafter.

d. Bidders whose bids contain a numeric or clerical error (as opposed to a mistake in judgment) may withdraw such bids within two business days of the date and time

of opening the bids by notifying the County Administrator of the decision to withdraw in writing. The bidder's original work papers shall be included with such notice.

11. **Qualifications of Bidders**

a. Each bidder may be required, before the award of any contract, to show that it has the necessary facilities, ability, and financial resources, to furnish the service specified herein in a satisfactory manner. The bidder may also be required to show past history and reference which will enable Shenandoah County to be satisfied as to the bidder's qualification. Failure to qualify according to the foregoing requirements will justify bid rejection.

b. To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid (a) written evidence establishing its qualifications (Section 00110, Contractor Qualifications), and (b) a Class A Contractor's license in Virginia.

c. Provide geosynthetic subcontractor qualifications per Section 00110.

d. A Bidder's failure to submit required qualification information at the time indicated may disqualify Bidder from receiving an award of the Contract.

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

12. **Expenses Incurred in Preparing Bid:**

Shenandoah County accepts no responsibility for any expense incurred in the bid preparation and presentation, such expenses to be borne exclusively by the bidder.

13. **Bidder Responsibility:**

Before submitting a bid, each bidder shall make all investigations and examinations necessary to ascertain all conditions and requirements affecting the full performance of the contract, and to verify any representations made by Shenandoah County that the bidder will rely upon. No plea of ignorance of such conditions and requirements will relieve the successful bidder from its obligation to comply in every detail with all provisions and requirements of the contract documents; nor will it be accepted as a basis for any claim whatsoever for any monetary considerations on the part of the successful bidder.

14. **Opening of Bids:**

a. All bids received on time will be opened and publicly read aloud.

b. Any bidder, upon request, will be afforded the opportunity to inspect bid records

within a reasonable time after the opening of all bids but prior to award, except in the event that the County decides not to accept any of the bids and to restart the procurement process. Otherwise, bid records shall be open to public inspection only after award of the contract.

15. **Insurance:**

a. Unless expressly waived by the County, the successful bidder shall maintain insurance to protect themselves and the County from claims under the Workman's Compensation Act, and from any other claim for damages for personal injury, including death, and for damages to property which may arise from operations under this contract, whether such operations be by the bidder or by any subcontractor or anyone directly employed by either of them. Such insurance shall conform to the specifications of this section, or the requirements of applicable law, if greater.

The successful bidder shall carry public liability insurance at least in the amounts specified below, including the contractual liability assumed by the contractor, and shall deliver Certificates of Insurance from carriers acceptable to the County specifying such limits, with the County named as an additional insured. In addition, the insurer shall agree to give the County 30 days' notice of its decision to cancel coverage.

- Worker's Compensation and Employer's Liability
  Coverage A – Statutory Requirements
  Coverage B – $100,000 Per Occurrence
  Coverage C – $100,000/$100,000 Accident and/or Disease
  All States Endorsement

- Automobile Liability, including Owned, Non-Owned and Hired Car Coverage
  Bodily Injury - $2,000,000 per person, $2,000,000 each occurrence

- Comprehensive General Liability
  Bodily Injury - $2,000,000 per occurrence, $2,000,000 annual aggregate
  Property Damage - $250,000 per occurrence, $250,000 annual aggregate

  Including Completed Operations/Products, Contractual Liability for Specified Agreement, Personal Injury, (XCU) Explosion, Collapse and Underground Coverage, Broad Form Property Coverage.

16. **Award of Contract:**

a. The Purchasing Agent reserves the right to waive any informality in bids and to reject any or all bids. Where doing so would not undermine the purposes of the County's procurement policy (in the sole judgment of the Purchasing Agent) the Purchasing Agent can, in its discretion, accept a bid which is non-conforming in one or more respects.

b. The Purchasing Agent shall have the right, before awarding the contract, to require a bidder to submit such evidence of his qualifications as it may deem necessary and may consider any evidence available to it concerning the financial, technical, and other qualifications and abilities of a bidder.

c. If the bid from the lowest responsible bidder exceeds available funds, the Purchasing Agent may negotiate with the apparent low bidder to obtain a contract within available funds. The Purchasing Agent or his or her designee shall advise the lowest responsible bidder, in writing, that the proposed purchase exceeds available funds. The Purchasing Agent shall further suggest a reduction in scope for the proposed purchase, and invite the lowest responsible bidder to amend its bid proposal based upon the proposed reduction in scope. Repetitive informal discussions with the lowest responsible bidder for purposes of obtaining a contract within available funds shall be permissible. The lowest responsible bidder shall submit an addendum to its bid, which addendum shall include: the change in scope for the proposed purchase, the reduction in price, and the new contract value. If the proposed addendum is acceptable to the Purchasing Agent, he or she may award a contract within funds available to the lowest responsible bidder based upon the amended bid proposal. If the Purchasing Agent and the lowest responsible bidder cannot negotiate a contract within available funds, all bids shall be rejected.

d. The bidder to whom the contract is awarded shall, within twenty days after prescribed documents are presented for signature, execute and deliver to the Purchasing Agent the contract forms and any other forms or bonds required by the bid.

e. The contract documents shall be subject to and governed by the laws of the Commonwealth of Virginia. Any dispute arising out of the contract documents, their performance, or their interpretation shall be litigated only in the state courts serving Shenandoah County, Virginia.

f. The Purchasing Agent reserves the right to bid individual jobs as it deems necessary.

g. Price is not the sole consideration in awarding a contract. Superior qualifications, life-cycle costing, value analysis, quality of workmanship, delivery cost and timing, and suitability for the County's particular purpose may all be taken into effect.

17. **Bonds:**

If the successful bidder is required to furnish a Performance Bond and a Labor and Material Payment Bond by the invitation to bid, or if the bid is for a construction contract in excess of $500,000, the successful bidder will be required to furnish a Performance Bond and a Labor and Material Payment Bond in accordance with the requirements of § 2.2-4337 of the Code of Virginia. Alternatively, the bidder may

provide a certified check, cashier's check, or cash escrow in the face amount required for the bond.

18. **Contractor's Performance:**

a. The successful bidder shall furnish all labor, materials and equipment necessary to fulfill the requirements of the contract in strict compliance with the terms, conditions, specifications and drawings of his bid and the contract documents.

b. The successful bidder agrees and covenants that his agents and employees shall comply with all Town, County, State and Federal laws, and rules and regulations applicable to the business to be conducted under this contract.

c. The successful bidder shall secure all necessary permits for the proper execution and completion of the work. All bids submitted shall include in price the cost of any business or professional licenses, permits or fees required by Shenandoah County, the Commonwealth of Virginia, or any other governmental entity. Do not include the cost of permits issued by the County in your bid price.

d. The successful bidder shall ensure that his employees exercise all necessary caution and discretion so as to avoid injury to person or damage to property of any and all kinds.

e. The successful bidder shall cooperate with County officials in performing the work so that interference with existing County operations will be held to a minimum.

f. The successful bidder agrees and covenants that he or she shall indemnify and hold the County and its employees and agents harmless against and from all liability, claims, damages and costs, including attorneys' fees of every kind attributable to bodily injury, sickness, disease or death or to damage to or destruction of property resulting from or in any manner arising out of or in connection with the project and the performance of the work under the contract, whether or not also caused in part by a person or entity indemnified by this agreement.

g. In case of any contractual default by the successful bidder, the Purchasing Agent, after due notice may procure the goods and/or services detailed in the contract from other sources and hold the successful bidder responsible for all damages including, without limitation, attorneys' fees and any other excess cost occasioned thereby.

19. **Employment Discrimination by Contractor Prohibited:**

a. During the performance of this contract, the successful bidder agrees as follows:

(1) The successful bidder will not discriminate against any employee or

applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The successful bidder agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

(2) The successful bidder, in all solicitations or advertisements for employees placed by or on behalf of the successful bidder, will state that such contractor is an equal opportunity employer.

(3) Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

b. The successful bidder shall include the provisions of the foregoing paragraphs of this section in every subcontract or purchase order of over $10,000 so that the provisions will be binding upon each subcontractor or vendor.

20. **Drug Free Workplace:**

During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clause in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor. For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with these provisions, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

21. **Compensation:**

a. The successful bidder shall be required to submit a complete itemized invoice on each delivery or service which he or she may perform under the contract.

b. Payment shall be rendered to the successful bidder for satisfactory compliance with the terms, conditions and specifications of the contract and within forty-five (45) days after the receipt of the proper invoice.

22. **Successful Bidder's Obligation to Pay Subcontractors:**

a. The successful bidder awarded the contract for this project shall take one of the two following actions within seven (7) days after the receipt of amounts paid to him by the County for work performed by his subcontractor(s) under the contract:

(1) Pay the subcontractor(s) for the proportionate share of the total payment received from the County attributable to the work performed by the subcontractor(s) under the contract; or

(2) Notify the County and subcontractor(s), in writing, of his intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment.

b. The successful bidder shall pay interest to the subcontractor(s) on all amounts owed by the contractor that remain unpaid after seven (7) days following receipt by the contractor of payment from the County for work performed by the subcontractor(s) under the contract, except for amounts withheld as allowed by paragraph (a)(2) above. Unless otherwise provided under the terms of this contract, interest shall accrue at the rate of one percent (1%) per month.

c. The successful bidder shall include in each of its subcontracts a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor(s).

d. The successful bidder's obligation to pay an interest charge to a subcontractor(s) pursuant to the payment clause in this section shall not be construed to be an obligation of the County. A contract modification shall not be made for the purpose of providing reimbursement for such interest charge and a cost reimbursement claim shall not include any amount for reimbursement for such interest charge.

e. The contractor agrees not to assign or subcontract any of the work or obligations required of him under this contract unless (i) the identities of all subcontractors are disclosed in the contractor’s bid, along with the scope of work to be performed by such subcontractors; or (ii) the County approves the use of the subcontractor in writing.

23. **Cancellation:**

a. The County reserves the right to terminate the contract immediately (i) in the event that the successful bidder discontinues or abandons operations; (ii) if adjudged bankrupt, or reorganized under any bankruptcy law; or (iii) fails to keep

in force any required insurance policies or bonds.

b. Failure of the successful bidder to comply with any section or part of the contract may be considered grounds for immediate cancellation of the contract by the County.

c. If the cancellation clause is used by the County, the successful bidder will be paid by the County for all scheduled work completed satisfactorily by the successful bidder up to the termination date set in the written cancellation notice.

24. **Exceptions and Specifications:**

Bidders taking exception to any part or section of these specifications shall indicate such exceptions on their bid or proposal. Failure to indicate any exceptions shall be interpreted as the bidder's intent to fully comply with the specifications as written. Conditional or qualified bids are subject to rejection in whole or in part.

25. **Governing Documents:**

This procurement is subject to the terms of Chapter 43 of the Shenandoah County Code. Copies are available upon request.

26. **Claims and Appeals:**

All claims against the County and appeals of County decisions shall be made in strict accord with the County's Procurement Policy. Compliance with the policy is mandatory.

27. The County does not discriminate against faith-based organizations.

28. **Site Conditions**

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

b. Subsurface and Physical Conditions

1. The Supplementary Conditions identify information for on-site materials that have the potential for use as the compacted clay liner.

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.

c. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous 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.

d. 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.

e. Site Visit and Testing by Bidders

1. Bidder may conduct Site visits with permission by Owner during normal working hours, and shall not disturb any ongoing operations at the Site.

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

3. 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.

4. 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.

5. 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.

29. **Pre-Bid Conference**

a. A mandatory pre-Bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Owner will transmit to all prospective Bidders of record such Addenda as Owner 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.

END OF SECTION

SECTION 00110

CONTRACTOR QUALIFICATIONS

GENERAL CONTRACTOR'S QUALIFICATION STATEMENT - Part 1

Criteria: In addition to the other requirements set forth in this Invitation for Bid package, the Contractor shall demonstrate that they have constructed at least three (3) landfill construction projects with geosynthetic materials in the eastern United States within the last ten (10) years. The construction cost for each representative project listed shall have been a minimum of $500,000.00. References for each project shall be provided below. The projects are to be identified and described below in response to questions 6 and 13. Failure of the referenced projects to meet the criteria descried above shall render the bid non-responsive. Subcontractors proposed by the Contractor shall be experienced in the type of work they will perform. Manufacturers and installers of geosynthetic materials shall have the appropriate experience as noted in the technical specifications for each of the geosynthetic materials (geocomposite drainage net and geomembrane). Qualifications for subcontractors shall be provided with the List of Subcontractors.

All questions must be answered and the data must be clear and comprehensive. If necessary, questions may be answered on separate attached sheets. The bidder may submit any additional information, as it deems necessary.

Generally, in addition to any other requirements set forth in the Instruction to Bidders, the Owner will, unless the Bidder has provided substantial proof to support otherwise or to the contrary, determine the responsible bidder using the following criteria:

The Bidder shall demonstrate to the full satisfaction of the Owner that as a Prime Contractor that it has and its subcontractors have the experience and capabilities to provide all the services necessary to complete the work.

1. Name of bidder:_____

2. Permanent main office address:_____
   Street and P.O. Box: _____
   City/State/Zip: _____

3. When organized: _____

4. If a corporation or business entity, where incorporated or organized: _____

5. How many years have you been engaged in the contracting business under your present firm or trade name? _____

6. Current contracts on hand (provide list with amount of each contract and the appropriate anticipated dates of completion) Use separate sheet if necessary:

_____
_____
_____
_____
_____

7. General character of work performed by your company:

_____
_____
_____
_____

8. Have you ever failed to complete any work awarded to you? ___ If so, explain:

_____
_____
_____
_____

9. Has a Surety company ever paid a claim or had to finish a project on your company's behalf? If so explain (when, where):

_____
_____
_____

10. Have you ever defaulted on a contract? _____

Explain in detail, use separate sheet if necessary (when, where):

_____
_____
_____
_____

11. Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

_____
_____

12. Has your firm ever been cited for safety violations? List and explain how, when, where:

_____
_____
_____
_____

13. List jurisdictions and trade categories in which your organization is legally qualified to do business and indicate registration or license numbers, if applicable.

_____
_____
_____

14. List jurisdictions in which your organization's partnership or trade name is filed.

_____
_____
_____

15. On a separate sheet, list your major equipment available for this contract.

16. On General Contractor Qualification Questionnaire, Part 2 of this statement, provide detailed experience in construction work similar in importance to this project (list any governmental projects first) including but not limited to; name, address and current phone number of owner, name, address and current phone number of architect/engineer, project dollar value, commencement and completion.

17. Background and experience of the principal members of your organization including officers:

_____
_____
_____

18. Credit available: $_____

19. Bank reference: _____
_____

20. Will you upon request fill out a detailed financial statement and furnish any other information that may be required? ____

21. General Contractor's License No. A_____
Attach copies of current federal, state, and local licenses.

CERTIFICATION:
I hereby certify that all information provided on this General Contractor's Qualification Statement - Part 1 and General Contractor's Qualification Questionnaire - Part 2 is true and accurate to the best of my knowledge.

_____	_____
NAME OF FIRM BIDDING	Authorized Signature
_____	_____
Date	Typed/Printed
	_____
	Title

This instrument was acknowledged before me on this _____ day of _____, 20___, and _____(name of person signing) appeared before me, the undersigned Notary Public in the _____.
(name of city/county and state)

Seal Here
(if applicable by state)

_____
Signature Notary Public

_____
Typed/Printed Name

My commission expires _____.

GENERAL CONTRACTOR'S QUALIFICATION QUESTIONAIRE -Part 2

Complete Part 1, General Contractor's Qualification Statement Form and this questionnaire Part 2, and submit with your bidding documents. Provide a detailed response to each statement and/or question. Include current information including, current phone numbers. If additional space is necessary this form may be retyped, however the Bidder shall use the same format as shown below.

SUBMITTED BY: _____

DATE SUBMITTED: _____

PROJECT NO. 1

Name of project: _____Date Completed: _____

Name/Address of Owner: _____

Name Contact Person: _____Phone No. _____

Name of Engineer: _____Phone No. _____

Contract Amount: _____Final Contract Amount: _____

Must provide a response to the items listed herein but, not limited to: project overview, multi-discipline work similar to the complex type and nature of this project, role as prime/subcontractor, project size, number acres/s.f., number of days the Owner's contract stipulated for project completion, number of days to final project completion:

_____
_____
_____
_____
_____
_____
_____

PROJECT NO. 2

Name of project: _____Date Completed: _____

Name/Address of Owner: _____

Name Contact Person: _____Phone No. _____

Name of Engineer: _____Phone No. _____

Contract Amount: _____Final Contract Amount:_____

Must provide a response to the items listed herein but, not limited to: project overview, multi-discipline work similar to the complex type and nature of this project, role as prime/subcontractor, project size, number acres/s.f., number of days the Owner's contract stipulated for project completion, number of days to final project completion:

_____
_____
_____
_____
_____
_____
_____

PROJECT NO 3

Name of project: _____Date Completed: _____

Name/Address of Owner: _____

Name Contact Person: _____Phone No. _____

Name of Engineer: _____Phone No. _____

Contract Amount: _____Final Contract Amount: _____

Must provide a response to the items listed herein but, not limited to: project overview, multi-discipline work similar to the complex type and nature of this project, role as prime/subcontractor, project size, number acres/s.f., number of days the Owner's contract stipulated for project completion, number of days to final project completion:

_____
_____
_____
_____
_____
_____

GEOSYNTHETIC SUBCONTRACTOR'S QUALIFICATION STATEMENT - Part 1

The apparent successful Bidder shall submit this form fully completed to the Owner with the Subcontractor's list at the time prescribed in the Instructions to Bidders.

All questions must be answered and the data must be clear and comprehensive. If necessary, questions may be answered on separate attached sheets. Submit any additional information, as it deems necessary.

The Bidder shall demonstrate to the full satisfaction of the Owner that its Geosynthetic Subcontractor is experienced and fully capable and qualified to install the cell liner.

This section is to be completed by Geosynthetic Installer:

1. Name of Subcontractor:_____

2. Permanent main office address:_____
   Street and P.O. Box: _____
   City/State/Zip: _____

3. When organized: _____

4. If a corporation or business entity, where incorporated or organized: _____

5. How many years have you been engaged in the contracting business under your present firm or trade name? _____

6. Current contracts on hand (schedule these showing amount of each contract and the appropriate anticipated dates of completion) Use separate sheet if necessary:

_____
_____
_____
_____
_____
_____
_____
_____
_____

7. General character of work performed by your company:

_____
_____
_____
_____

8. Have you ever failed to complete any work awarded to you? ___ If so, explain:

_____
_____
_____
_____

9. Has a Surety company ever paid a claim or had to finish a project on your company's behalf? If so explain (when, Where):

_____
_____
_____

10. Have you ever defaulted on a contract? _____

Explain in detail, use separate sheet if necessary (when, where):

_____
_____
_____
_____

11. Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

_____
_____

12. Has your firm ever been cited for safety violations? List and explain how, when, where:

_____
_____
_____
_____

13. List jurisdictions and trade categories in which your organization is legally qualified to do business and indicate registration or license numbers, if applicable.

_____
_____
_____

14. List jurisdictions in which your organization's partnership or trade name is filed.

_____
_____
_____

15. On a separate sheet, list your major equipment available for this contract.

16. On Geosynthetics Subcontractor Qualification Questionnaire, Part 2 of this statement, provide detailed experience in construction work similar in importance to this project (list any Governmental projects first) including but not limited to; name, address and current

phone number of owner, name, address and current phone number of architect/engineer, project dollar value, commencement and completion.

17. Background and experience of the principal members of your organization including officers:

_____
_____
_____

18. Credit available: $_____

19. Bank reference: _____
_____

20. Will you upon request fill out a detailed financial statement and furnish any other information that may be required? ____

21. Subcontractor's License No. A or B _____
Expiration: _____
Attach copies of current federal, state, local licenses.

CERTIFICATION:
I hereby certify that all information provided on this Geosynthetic Subcontractor's Qualification Statement - Part 1 and Geosynthetics Subcontractor's Qualification Questionnaire - Part 2 is true and accurate to the best of my knowledge.

_____ _____
NAME OF FIRM BIDDING Authorized Signature

_____ _____
Date Typed/Printed

_____
Title

This instrument was acknowledged before me on this _____ day of _____, 20___, and _____(name of person signing) appeared before me, the undersigned Notary Public in the _____.
(name of city/county and state) Seal Here
(if applicable by state)

_____
Signature Notary Public

_____
Typed/Printed Name

My commission expires _____.

GEOSYNTHETHIC SUBCONTRACTOR'S QUALIFICATION QUESTIONAIRE - Part 2

The apparent successful Bidder shall submit this form fully completed to the Owner with the Subcontractor's list at the time prescribed in the Instructions to Bidders.

SUBMITTED BY: _____

DATE SUBMITTED:_____

This section is to be completed by Geosynthetic Installer:

SUBCONTRACTOR INFORMATION:
NAME OF SUBCONTRACTOR: _____
ADDRESS: _____
CITY/STATE/ZIP: _____
PHONE NO.: _____
VA. CONTRACTOR REG. NO./CLASS: _____
(attach a copy of registration)

Provide a detailed response to each statement and/or question. Include current phone numbers and contact person. If additional space is necessary, this form may be retyped using the same format as shown herein.

PROJECT NO. 1

Name of project: _____Date Completed: _____

Name/Address of Owner: _____

Name Contact Person: _____Phone No. _____

Name of Engineer: _____Phone No. _____

Contract Amount: _____Final Contract Amount: _____

Provide information regarding **geosynthethics** and include multi-discipline work similar to the complex type and nature of this project that your organization has completed, including role as prime/general or subcontractor, type/nature of work, size, number acres/s.f., etc.:

_____
_____
_____
_____
_____
_____
_____

PROJECT NO. 2

Name of project: _____Date Completed: _____

Name/Address of Owner: _____

Name Contact Person: _____Phone No. _____

Name of Engineer: _____Phone No. _____

Contract Amount: _____Final Contract Amount: _____

Provide information regarding **geosynthethics** and include multi-discipline work similar to the complex type and nature of this project that your organization has completed, including role as prime/general or subcontractor, type/nature of work, size, number acres/s.f., etc.:

_____
_____
_____
_____
_____
_____
_____

PROJECT NO. 3

Name of project: _____Date Completed: _____

Name/Address of Owner: _____

Name Contact Person: _____Phone No. _____

Name of Engineer: _____Phone No. _____

Contract Amount: _____Final Contract Amount _____

Provide information regarding **geosynthethics** and include multi-discipline work similar to the complex type and nature of this project that your organization has completed, including role as prime/general or subcontractor, type/nature of work, size, number acres/s.f., etc.:

_____
_____
_____
_____
_____
_____
_____

SECTION 00300

BID FORM

PROJECT IDENTIFICATION: **Shenandoah County Landfill Phase 4 Construction**

Date: _____

THIS BID IS SUBMITTED TO: **Shenandoah County Administrator**
600 N. Main Street, Suite 102
Woodstock, Virginia 22664

1.01 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.

2.01 Bidder accepts all of the terms and conditions of the Bid Information and Requirements, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for sixty (60) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of OWNER.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

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

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

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

C. Bidder is familiar with and is satisfied as to all federal, state, and local laws and regulations that may affect cost, progress, or performance of the Work;

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 noted in the Bid Form, 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 further represents that 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 coordination with any agreement with any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

K. Bidder will accept the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work by the dates specified, which shall be stated in the Agreement.

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

1. Required Bid security.

2. A tabulation of Subcontractors, Suppliers and other individuals and entities required to be identified in this Bid.

3. Contractor Qualifications and license.

4. Worker’s Compensation, Certificate of Coverage

5. Bid Form – Schedule of Prices

5.01 The terms used in this Bid have the meanings indicated in the General Conditions and the Supplementary Conditions.

6.01 Bid Submittal Certification:

SUBMITTED ON _____, _____.

Virginia Contractor License No. _____.

If Bidder is:

An Individual

Name (typed or printed): _____
By: _____
(SEAL)
(Individual's signature)

Doing business as: _____
Business address: _____
_____
Phone No.: _____ FAX No.: _____

A Partnership

Partnership Name: _____(SEAL)

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

Name (typed or printed): _____

Business address: _____

_____

Phone No.: _____ FAX No.: _____

A Corporation

Corporation Name: _____(SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)
Attest

_____
(Signature of Corporate Secretary)

Business address: _____

_____

Phone No.: _____ FAX No.: _____

Date of Qualification to do business is _____.

A Joint Venture

Joint Venturer Name: _____(SEAL)

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ FAX No.: _____

Joint Venturer Name: _____(SEAL)

By: _____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ FAX No.: _____

Phone Number, and Address for receipt of official communications:

_____

_____

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

COMMONWEALTH OF VIRGINIA

WORKERS' COMPENSATION

Certificate of Coverage

Section 2.2-4332., Code of Virginia, requires construction contractors and subcontractors to obtain and maintain workers' compensation insurance while performing work on behalf of the Commonwealth of Virginia, its departments, institutions or agencies. This same requirement applies on behalf of local governments.

Evidence of coverage must be provided prior to commencement of work.

This form must be returned to the organization contracting the work.

The undersigned organization stipulates that it:

A. Has workers' compensation insurance and is in compliance with the Workers' Compensation statutes of the Commonwealth of Virginia. ___ Yes ___ No

Insurance Company
_____

Policy Expiration Date
_____ or,

B. Is self-insured for workers' compensation. ___ Yes

Title of Construction Contract: **Shenandoah County Landfill Phase 4 Construction**

Signed by: _____

Title: _____

Firm Name: _____

Address: _____

_____

_____

SECTION 00300

BID FORM
SCHEDULE OF PRICES
Phase 4 Construction
Shenandoah County Landfill
Edinburg, Virginia

5/29/2020

* Descriptions for each Item are provided in Specification Section 01025, "Measurement and Payment"

ITEM	QUANTITY	UNIT	DESCRIPTION	PRICE	TOTAL
A			LUMP SUM PAY ITEMS		
1	1	LS	MOBILIZATION/DEMOBILIZATION	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
2	1	LS	EROSION AND SEDIMENT CONTROLS	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
3	1	LS	CLEARING, GRUBBING AND STRIPPING	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
4	1	LS	SURVEYING	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
5	1	LS	PERIMETER BERMS AND STORMWATER CHANNELS	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
6	1	LS	COMPACTED CLAY LINER	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
7	1	LS	GEOMEMBRANE	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
8	1	LS	GEOCOMPOSITE DRAINAGE NET (GDN)	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
				SUBTOTAL THIS SHEET	$

SECTION 00300

BID FORM
SCHEDULE OF PRICES
Phase 4 Construction
Shenandoah County Landfill
Edinburg, Virginia

5/29/2020

* Descriptions for each Item are provided in Specification Section 01025, "Measurement and Payment"

ITEM	QUANTITY	UNIT	DESCRIPTION	PRICE	TOTAL
9	1	LS	PROTECTIVE LAYER	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
10	1	LS	TOPSOIL	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
11	1	LS	LEACHATE COLLECTION AND CONVEYANCE SYSTEM	THE LUMP SUM PRICE OF _____DOLLARS AND CENTS	$
				SUBTOTAL THIS SHEET	$
				SUBTOTAL SCHEDULE "A" (ITEMS 1 THROUGH 11)	$

SECTION 00300

BID FORM
SCHEDULE OF PRICES
Phase 4 Construction
Shenandoah County Landfill
Edinburg, Virginia

5/29/2020

*** Descriptions for each Item are provided in Specification Section 01025, "Measurement and Payment"**

ITEM	QUANTITY	UNIT	DESCRIPTION	PRICE	TOTAL
B			UNIT PRICE PAY ITEMS		
1	96,000	CY	CELL EXCAVATION	_____DOLLARS AND_____CENTS PER CUBIC YARD	$
2	2.5	AC	PERMANENT SEEDING	_____DOLLARS AND_____CENTS PER ACRE	$
3	27,000	SY	RAIN COVER	_____DOLLARS AND_____CENTS PER SQUARE YARD	$
4	5,000	CY	BORROW AREA DEVELOPMENT	_____DOLLARS AND_____CENTS PER CUBIC YARD	$
				SUBTOTAL THIS SHEET AND SCHEDULE "B" (ITEMS 1 THROUGH 4)	$
TOTAL FOR ALL BASE BID PAY ITEMS ('A' AND 'B' ITEMS):					$

I hereby certify that the above lump sum,unit price and contingency pay item prices are true and correct.
I further certify that the said prices are not disproportioned or unbalanced.

Signature: _____

END OF SECTION

BID BOND (PENAL SUM FORM)

Bidder Name: Address *(principal place of business)*:	**Surety** Name: Address *(principal place of business)*:
Owner Name: Address *(principal place of business)*:	**Bid** Project *(name and location)*: **Shenandoah County Landfill Phase 4 Construction, Edinburg, Virginia 22824** Bid Due Date:
Bond Penal Sum: Date of Bond:	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder _____ *(Full formal name of Bidder)* By: _____ *(Signature)* Name: _____ *(Printed or typed)* Title: _____ Attest: _____ *(Signature)* Name: _____ *(Printed or typed)* Title:	Surety _____ *(Full formal name of Surety) (corporate seal)* By: _____ *(Signature) (Attach Power of Attorney)* Name: _____ *(Printed or typed)* Title: _____ Attest: _____ *(Signature)* Name: _____ *(Printed or typed)* Title:
Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.	

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1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs 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 will 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 does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will 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 will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must 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 Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will 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 will 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 governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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

This Agreement is by and between Shenandoah County ("Owner") and _____ ("Contractor").

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

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: Shenandoah County Landfill Phase 4 Construction.

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Shenandoah County Landfill Phase 4 Construction, Edinburgh, Virginia.

ARTICLE 3—ENGINEER

3.01 The Owner has retained SCS Engineers ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by SCS Engineers.

ARTICLE 4—CONTRACT TIMES

4.01 *Time is 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: Days*

A. All Work associated with the Phase 4 Cell construction will be substantially complete within 150 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 180 days after the date when the Contract Times commence to run.

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 Contract Times, as duly modified. 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.

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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 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified 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 $500 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.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

4.04 *Special Damages*

A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.

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, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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

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6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the 30th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

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

a. 90 percent of the value of the Work completed (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

A. All amounts not paid when due will bear interest at the rate of 1.5 percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

A. The Contract Documents consist of all of the following:

1. This Agreement.
2. Bonds:

a. Performance bond (together with power of attorney).

b. Payment bond (together with power of attorney).

3. General Conditions.
4. Supplementary Conditions.

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5. Specifications as listed in the table of contents of the project manual bearing the title "Shenandoah County Landfill, Phase 4 Construction" and as listed in the table of contents of the Project Manual.

6. Drawings (not attached but incorporated by reference) with each sheet bearing the following general title: "Shenandoah County Landfill, Phase 4 Construction".

7. Addenda (numbers _____ to _____, inclusive).

8. Exhibits to this Agreement (enumerated as follows):

    a. Contractor's Bid Form (with Schedule of Prices);

    b. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____ inclusive).

9. 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.

    e. Warranty Bond, if any.

B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 7.

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

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

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

1. Contractor has examined and carefully studied the Contract Documents, including Addenda.

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

3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.

4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the

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Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. 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 Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. 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.

8. 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.

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

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

11. 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.

8.02 *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 8.02:

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;

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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.

8.03 *Standard General Conditions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), 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.

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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:

_____
(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

*(If **[Type of Entity]** is a corporation, attach evidence of authority to sign. If **[Type of Entity]** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*

Contractor:

_____
(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

*(If **[Type of Entity]** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

License No.: _____
(where applicable)

State: _____

EJCDC® C-520, Agreement between Owner and Contractor for Construction Contract (Stipulated Price).
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PERFORMANCE BOND

Contractor Name: Address *(principal place of business)*:	**Surety** Name: Address *(principal place of business)*:
Owner Name: Mailing address *(principal place of business)*:	**Contract** Description *(name and location)*: **Shenandoah County Landfill Phase 4 Construction, Edinburg, Virginia 22824** Contract Price: Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 16

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

Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
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 is considered plural where applicable.

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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 will 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 may 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 will 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 does 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 does 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:

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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 will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will 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 will not be reduced or set off on account of any such unrelated obligations. No right of action will 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 must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must 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 will be applicable.

12. Notice to the Surety, the Owner, or the Contractor must 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 will be deemed deleted therefrom and provisions conforming to such

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statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will 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 will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

Contractor Name: Address *(principal place of business)*:	**Surety** Name: Address *(principal place of business)*:
Owner Name: Mailing address *(principal place of business)*:	**Contract** Description *(name and location)*: **Shenandoah County Landfill Phase 4 Construction, Edinburg, Virginia 22824** Contract Price: Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 18

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

Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
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 is considered plural where applicable.

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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 will 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 will 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 will 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.

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8. The Surety's total obligation will 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 will 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 will 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 satisfying 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 will 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 will be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will 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 will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will 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:

        16.1.1. The name of the Claimant;

        16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

        16.1.3. 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;

        16.1.4. A brief description of the labor, materials, or equipment furnished;

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16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.1.7. The total amount of previous payments received by the Claimant; and

16.1.8. 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 is 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 will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By

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ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

ACEC
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ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

NSPE®
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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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 document prepared by Contractor, in a form acceptable to Engineer, to request 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; 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; contesting an initial decision by Engineer concerning the

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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.

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.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. 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), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations 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 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. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

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recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

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

23. *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.

24. *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.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

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

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

27. *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.

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

29. *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.

30. *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.

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

32. *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.

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

34. *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.

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

36. *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.

37. *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.

38. *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 or areas furnished by Owner which are designated for the use of Contractor.

39. *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.

40. *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.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *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 of such Work.

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43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

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

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

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

49. *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.

50. *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.

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1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: 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*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

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

1. does not conform to the Contract Documents;

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

3. 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 Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means 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, means 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, means 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.

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F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. 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 Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), 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 signed 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 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

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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 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents 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 Electronic Documents.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document 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 versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will 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.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. 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.

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, means 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, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer 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 or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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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 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 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 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 in writing 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.

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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 notify Owner and Contractor in writing 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 versions, 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 precludes 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 30th 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 60th day after the day of Bid opening or the 30th 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 may 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

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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 must 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 will 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 Contract Price or 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. Such an adjustment will 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 third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

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D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

2. Contractor shall not be entitled to an adjustment in Contract Price 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. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. 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, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses 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.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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.

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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, or to improvements, structures, utilities, or similar facilities located at such adjacent lands 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 7.13, 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 in a court of competent jurisdiction; 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 will 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

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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 of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: 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 Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: 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;

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

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

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

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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:

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;

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

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 whether it is necessary for Owner to obtain 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; 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. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, 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

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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 subject to the provisions of Paragraphs 4.05.D and 4.05.E.

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;

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 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, then any such adjustment will 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, 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.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

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

2. complying with applicable state and local utility damage prevention Laws and Regulations;

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3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

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

5. 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 on the Drawings, or was not shown or indicated on the Drawings 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), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; 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

4. 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. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

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or indicated on the Drawings, 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. 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;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. 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, then any such adjustment will 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, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

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

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; 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 on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. 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

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of construction to be employed by Contractor, and safety precautions and programs incident thereto;

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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, 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. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

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

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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, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates 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 obligates 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 Contractor's obligations under the Contract. These bonds must 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 terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

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Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, 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 must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

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

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. 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.

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

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

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. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

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Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. 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, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. 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.

H. Contractor shall require:

   1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

   2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain 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.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) 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 will be adjusted accordingly.

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L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, 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 and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, 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;

4. apply with respect to the performance of the Work, whether such performance is 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; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

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4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other 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 Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

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 advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. 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 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

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Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. 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, risks, 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 individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater 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.

2. None of the above waivers extends 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. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, 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, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. 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 all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

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6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 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 6.04 shall maintain such proceeds in a segregated account, and 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, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.

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

7.03 *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 maintain good discipline and order at the Site.

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

C. 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 will 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.

7.04 *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 must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, 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 equipment or material, or items from other proposed Suppliers, under the circumstances described below.

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

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

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

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

4) is not objectionable to Owner.

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

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

2) the item 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 will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material 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 equipment or material under the circumstances described below. To the extent possible such requests must 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 equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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

   a. will 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 the item specified; and

      3) be suited to the same use as the item 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 the item specified; and

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

   d. will 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.

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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 will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers 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 or Supplier 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 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. 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 or Suppliers 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 or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, 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 or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

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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 solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

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

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

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed 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.

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7.09 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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.

7.10 *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.

7.11 *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. 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 is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give written 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 written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *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.

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7.13 *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.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. 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.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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).

E. 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.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that 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.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. 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.

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I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will 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.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

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

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

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) 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

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must 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.

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3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

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

b. Data shown on the Shop Drawings must 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.C.

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.C.

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. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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 will 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

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document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 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, will 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 or Sample will 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.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

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 Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

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

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

   a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

   c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

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d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

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 is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

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

1. abuse, or improper modification, 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.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

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. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

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9. Any correction of defective Work by Owner.

E. 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 will 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 losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 will 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.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

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D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;
2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

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

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

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 third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. 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.

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E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

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 for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, 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. 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 will 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, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will 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 or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

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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.

1. 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 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 8.03.B.

2. 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 Contractor.

C. 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 will 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.

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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 (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.

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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 10.07. 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 *Resident 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 the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

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

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *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.

10.06 *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.

10.07 *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, will 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 Contractor under 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 10.07 also apply to the Resident Project Representative, if any.

10.08 *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 of which Engineer has been informed.

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ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

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

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that 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, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

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

1. Changes in 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 11.05, (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 that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

A. 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 11.07 regarding change of Contract Price.

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B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. 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.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *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. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work 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 must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates 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.

11.06 *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.C.2.

11.07 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

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

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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);
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 11.07.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 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will 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 will be 15 percent;
    b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.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 5 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 will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
    d. No fee will 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 of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
    f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

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11.08 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: 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.

   a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

   b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

   The supporting data must 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.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

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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.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *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 in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *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 are subject 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;

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; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

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 rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, 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

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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 will 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 will 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 will 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 will 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 will 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 will 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 will be incorporated in a Change Order or other written document 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

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2. When needed 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 will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will 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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, 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, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will 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 or retained for services specifically related to the Work.

5. Other costs consisting of 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, which are

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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.

1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

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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 does not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general 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. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

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

5. 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.

6. Expenses incurred in preparing and advancing Claims.

7. 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*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

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Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

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 for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will 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

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thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

   a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

   b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

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 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 with such procedures and programs 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 will 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.

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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 will 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 will 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 written 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,

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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 will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

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

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

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

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

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, 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,

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or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will 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 defective Work as required by Engineer, then Owner may, after 7 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 for 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.

2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

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establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) 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.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. 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.

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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;

    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; 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 based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from 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;

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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 has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other 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; or

l. Other items entitle 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 will 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 will be treated as an amount due as determined by Paragraph 15.01.D.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 7 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

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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 will 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 7 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

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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 15.03.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 6.04 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 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must 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.

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d. a list of all duly pending Change Proposals and Claims; 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 Final Application and Recommendation of Payment*: 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 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will 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. 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. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *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 and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

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appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

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 as a Claim, 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 Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect 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 adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, 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 from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, 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 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. 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.

E. 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.

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F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to 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 directly attributable to any such suspension. Any Change Proposal seeking such adjustments must 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) 10 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) written 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 7 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,

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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 will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 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 for any loss of anticipated profits or revenue, post-termination overhead costs, 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 7 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, 7 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

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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, pursuant to Article 12; and
2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise 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;
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 requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

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.

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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 will not constitute a waiver of that provision, nor will 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 of the Contract or 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 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party 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.

18.09 *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.

18.10 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 00800

SUPPLEMENTARY CONDITIONS

The following supplements modify, change, delete from or add to the "Standard General Conditions of the Construction Contract," EJCDC Document C-700, 2018 edition. Where any Articles of the General Conditions is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

Article 5.03 Per Article 5.03, the following information will be made available regarding subsurface conditions:

1. Approximate location of test pits excavated to estimate the presence of soil materials potentially adequate for use in constructing the Compacted Clay Liner.
2. Test results of soil materials collected from the test pits.

Article 5.06 Delete Article 5.06.I.

Article 6.03 Add the following immediately after Article 6.03.C:

D. The limits of liability for the insurance required by Article 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations or Specification Section 00100, Bid Information and Requirements, in Part 15, Insurance :

1. Workers' Compensation:

a.	State:	Statutory
b.	Applicable Federal (e.g., Longshoremen's):	Statutory

2. Contractor's General Liability that shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

a.	General Aggregate	$ 2,000,000
b.	Products – Completed Operations Aggregate	$ 2,000,000
c.	Personal and Advertising Injury	$ 2,000,000
d.	Excess or Umbrella Liability	
	1) General Aggregate	$ 2,000,000
	2) Each Occurrence	$ 2,000,000

3. The Contractual Liability:

a.	Bodily Injury:	$ 2,000,000
	Each Accident	$ 2,000,000
	Each Aggregate	$ 2,000,000
b.	Property Damage:	
	Each Accident	$ 2,000,000
	Annual Aggregate	$ 2,000,000

Article 7.08 Delete Article 7.08.B.

Article 9.01 Add the following immediately after Article 9.01.A.

B. In general, the OWNER will be managing the project and communicating directly with the CONTRACTOR. CONTRACTOR payment applications and other correspondence shall be directly with the OWNER. The ENGINEER will provide construction quality assurance, interpretations of the drawings and specifications, and other services related to determining that construction is in accordance with the intent of the design. At his discretion, the OWNER may perform responsibilities attributed to the ENGINEER in the General Conditions.

Article 10.03 Delete Article 10.03.B.

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions, Supplementary Conditions, and all Specification Sections apply to this Section.

1.2 PROJECT DESCRIPTION

A. The Project: The Project generally involves the construction of a soil and geosynthetic liner system and leachate collection and conveyance system for a new waste disposal cell at a municipal solid waste (MSW) landfill.

B. The Project site is located at the Shenandoah County Landfill located off Route 11, north of the Town of Edinburg, Virginia as shown on the Contract Documents.

C. The Work to be performed by the CONTRACTOR under this project consists of performing all work and providing all labor, services, tools, machinery, equipment, and materials necessary to complete the project. The Work includes, but is not limited to the following items:

1. Site preparation including:

   a. Construction Staking/Surveying.

   b. Installation of erosion and sediment control devices.

2. Clearing, grubbing and stripping.

3. Excavation of area for the new waste disposal cell. Excavation will involve separating and stockpiling clay materials for use in the Compacted Clay Liner, topsoil, general fill, and the removal and stockpiling of bedrock. Screening and/or processing of the materials may be necessary to meet gradation requirements.

4. Excavation and relocation of waste materials to locate the existing liner/leachate systems for tie-in to new liner/leachate systems. CONTRACTOR shall place the MSW as directed by the OWNER for grading and compaction by the OWNER.

5. Filling and compaction of soil to construct berms, slopes or other features.

6. Installation of a Compacted Clay Liner, geomembrane, geocomposite drainage net (GDN), and Protective Layer for the liner/leachate systems.

7. Construction of drainage channels, pipes and associated stormwater measures (including associated temporary or permanent erosion and sediment controls).

8. Installation of topsoil layer over denuded areas (excluding liner/leachate systems within the cell).

9. Installation of rain cover over the liner/leachate systems within the cell.

10. Construction of temporary access roads as needed for access of the work. Location of the roads, if any, to be coordinated with the OWNER.

11. Installation of sump control panel roof, valves, meters and pipe force mains for conveyance of leachate to the existing leachate manhole.

12. Providing temporary field offices, storage, sanitary facilities, and communication equipment.

13. Maintenance of stockpiles and borrow areas associated with the work including appropriate erosion and sediment controls.

14. Providing Record Drawings depicting all in place construction as required in the specifications.

15. Construction quality control testing and inspections as required in the specifications.

16. Temporary and permanent seeding and establishment of grass on all disturbed areas within the limits of construction (excluding areas covered by rain tarp and/or new liner/leachate systems within the cell).

17. Disposing of waste generated from Project Work at the Shenandoah County Landfill or other site approved by ENGINEER. CONTRACTOR will not be charged a tipping fee at the Shenandoah County Landfill, but is responsible for all hauling. The CONTRACTOR will be required to take waste materials generated as part of the work over the scales to allow for proper disposal documentation. MSW being moved from one area of the MSW landfill to another as part of the project shall not be taken over the scales as the MSW has already been documented.

1.3 WORK SEQUENCE

A. The CONTRACTOR is responsible for establishing a construction schedule per the General Conditions, to be approved by the OWNER, and for the sequence and progress of the work. Contractor shall be solely responsible for coordination of all the work within the time limits specified in the Contract.

B. The CONTRACTOR shall complete all work associated with the Phase 4 Cell construction PRIOR to beginning work on the leachate controls, control panel and leachate force main improvements.

1.4 CONTRACTOR USE OF PREMISES

A. The CONTRACTOR shall have equipment and material delivery access to and from the site as noted in the General Conditions. Material (excluding MSW) may be stockpiled in locations designated by the OWNER.

B. No later than 15 days after notice to proceed, the CONTRACTOR shall arrange with the OWNER a sequence of procedures, means of access, space for storage of materials and equipment, and use of approaches and roadways.

C. CONTRACTOR'S use of the premises shall be confined to the areas approved by the OWNER.

D. Smoking: Smoking is prohibited on the landfill property.

E. Private Driveways: The CONTRACTOR shall not use private driveways or otherwise use private residential properties for vehicle turnarounds, parking, material storage or any other use.

F. CONTRACTOR shall not dispose of waste oils, fuels, cleaners, or any potentially hazardous substances on-site.

1.5 OWNER OCCUPANCY

A. The OWNER will occupy the site and continue to conduct landfill operations at the active landfill cells. In addition, the OWNER performs on-going groundwater and landfill gas monitoring programs at the site. THE CONTRACTOR shall cooperate with the OWNER during construction operations to minimize conflicts and facilitate OWNER usage. The CONTRACTOR shall perform the Work so as not to interfere with the OWNER’S landfill operations, maintenance, environmental monitoring, and other OWNER activities at the site.

1.6 SITE CONDITIONS

A. Existing Grades: Existing grades may vary from those indicated on the Drawings due to changes during minor grading operations conducted in recent years and due to settlement of and on-going filling of the landfill.

B. Existing Features: The Contract Documents require the CONTRACTOR to field verify the location of existing features, see Section 01050-Surveying, and to locate underground utilities.

C. The CONTRACTOR shall enforce safety procedures to minimize hazards to workers, the public, and the environment.

1.7 SUBMITTALS

A. Site Health and Safety Plan: The work at the landfill is within a zone of potential landfill gas migration. The CONTRACTOR is responsible for site health and safety for his employees. The OWNER will make available to the selected CONTRACTOR laboratory analysis of landfill gas recorded at the site and the landfill's Operations Manual. Within 15 days of starting work, the CONTRACTOR shall prepare a Site Health and Safety Plan, and provide a copy of this Plan to the ENGINEER and the OWNER for informational purposes only. The Site Health and Safety Plan shall be prepared in accordance with applicable provisions of OSHA regulations 29 CFR 1910.120 and 1926 and "A Compilation of Landfill Gas Field Practices and Procedures", prepared by SWANA Landfill Gas Division (2011), in case waste or landfill gas is encountered during construction. The document is available from the Solid Waste Association of North America (SWANA).

1. For bidding purposes, all bidders should include obtaining and using a landfill gas monitoring instrument (e.g., Photoionization Detector, Hnu or similar), for measuring lower explosive limit (LEL) and H_2S within all excavations made in the landfill and its vicinity.

B. Written plan of CONTRACTOR'S proposed sequence of construction. Submit within fifteen (15) days after the Notice to Proceed and receive ENGINEER'S approval prior to commencing the work.

C. Submit Shop Drawings, Record Drawings, independent quality control laboratory test results, test results from field measurements/sampling, manufacturer's specifications and literature for various products, and other information as described within the specifications.

D. Other submittals as specified in the Contract Documents.

E. Schedule of Values as described in the General Conditions.

1.8 CONSTRUCTION QUALITY ASSURANCE

A. The CONTRACTOR is responsible for material and other testing in accordance with the Drawings and Specifications.

B. The OWNER plans to hire an independent Construction Quality Assurance (CQA) testing firm to verify that construction is completed in accordance with the Drawings and Specifications. It is the CONTRACTOR'S responsibility to coordinate and cooperate with the OWNER'S CQA representative(s) at all times. Areas that are deemed not in compliance or that do not meet the requirements of the Drawings and Specifications (including failed CQA test results) must be repaired by the CONTRACTOR to the requirements of the Drawings and Specifications at no additional cost to the OWNER. The CQA representative may be the ENGINEER.

1.9 OWNER SUPPLIED MATERIALS

A. The OWNER has conducted preliminary testing to assess whether there is sufficient soil available for construction of the Compacted Clay Liner. Potential borrow areas for the material are noted in the Drawings. The CONTRACTOR may use this material if it meets the material, hydraulic conductivity, and other requirements in the specifications.

1. CONTRACTOR to utilize suitable clay materials excavated from the Phase 4 area. If additional clay material is required, then OWNER will assess the need for Borrow Area Development outside of the Phase 4 area.

2. CONTRACTOR to obtain OWNER approval before initiating Borrow Area Development outside of the Phase 4 area.

B. CONTRACTOR is responsible for evaluating the potential borrow areas and determining the suitability of their use for a specific application.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. The items listed below beginning with Part 3.1, refer to and are the same pay items listed on the Schedule of Prices. They constitute all of the lump sum and unit price pay items for the completion of the Work.

B. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, services for CONTRACTOR'S field offices and sheds, job signs, sanitary requirements, testing, safety devices, submittals, record drawings, water supplies, dust controls, power, removal of CONTRACTOR generated waste, watchmen, security, bonds, insurance, and all other conditions of the General Conditions. Compensation for all such labor, materials, and services shall be included in the bid prices stipulated for the lump sum and unit price pay items.

C. Each bid price will be deemed to include an amount considered by the CONTRACTOR to be adequate compensation to cover the CONTRACTOR's overhead and profit for each of the separately identified pay items.

D. General earthwork for construction shall not be paid for separately and shall be included in the prices for the lump sum and unit price pay items.

E. All CONTRACTOR Health and Safety provisions to perform the work will not be paid for separately and shall be included in the bid prices stipulated for the lump sum and unit price pay items.

F. CONTRACTOR Quality Control (CQC) Plan and associated testing provisions during the progression of the Work will not be paid for separately and shall be included in the bid prices stipulated for the lump sum and unit price pay items.

1.2 RELATED DOCUMENTS

A. Drawings and Project Manual of the Contract, including General Conditions and Supplementary Conditions and other Project Manual Specification Sections, apply to this Section.

1.3 SUMMARY

A. This Section specifies administrative and procedural requirements for lump sum and unit price pay items.

1. A Lump Sum price is an amount bid on the Bid Form as a price where

measurement will not be made for payment for materials, services and/or work identified in the Drawings and Specifications for a particular pay item. The CONTRACTOR will not be entitled to any adjustment in a lump sum bid price as a result of any change caused by a variation in quantities as a result of more accurate measurements. The CONTRACTOR agrees to accept the lump sum bid price as complete and total compensation for all work to be performed under a lump sum pay item.

2. A Unit Price is an amount bid on the Bid Form as a price per unit of measurement on the basis noted in the individual unit price pay items.

   If actual quantities of work are less than or exceed estimated quantities then adjustments in the unit price bid for the work may be made upon request by the CONTRACTOR or OWNER as stipulated in the General Conditions.

3. If the CONTRACTOR has not provided the specified notice to the OWNER, then the OWNER reserves the right to reject the CONTRACTOR's measurement of work-in-place that involves use of established unit price pay items, and to have this work measured by an independent or OWNER surveyor at the CONTRACTOR'S expense.

4. The OWNER reserves the right to reject CONTRACTOR'S work in place until the work meets the Drawings and Specifications and as specified in the General Conditions.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 MEASUREMENT AND PAYMENT

A. LUMP SUM PAY ITEMS

A1. MOBILIZATION AND DEMOBILIZATION

Measurement and Payment: Measurement of the various items of Work required for Mobilization and Demobilization will not be made for payment and all items shown on the Drawings and/or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for Mobilization and Demobilization shall be made at the Contract Lump Sum Price which price and payment shall be full compensation for the preparatory work and operations in mobilizing for the commencement of the work including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site, and for any other pre-construction expense necessary for the start of the work. Mobilization

and Demobilization shall also include bonds; permits; utility services; sanitary facilities; CONTRACTOR's temporary field offices; construction photographs; construction videos, construction staking and incidental surveying; surveying controls, field measurements for payment, and record drawings.

The lump sum price for Mobilization and Demobilization shall not exceed 10% of the of the Contract Bid amount (excluding mobilization and demobilization). The CONTRACTOR shall be allowed to request a partial payment of up to 70% of the Lump Sum bid price after the completion of mobilization, and request the remaining balance of the Lump Sum bid price after the completion of demobilization.

A2. EROSION AND SEDIMENT CONTROLS

Measurement and Payment: Measurement for Erosion and Sediment Controls will not be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for the Erosion and Sediment Controls shall be made at the lump sum price, which price and payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals required for installation and maintenance of permanent and temporary erosion control measures, as well as the removal of temporary erosion control measures. Erosion control measures shall include diversion dikes, pipe slope drains, culvert inlet protection, dewatering structures, temporary seeding, and other erosion control measures required to meet the requirements of the Virginia Erosion and Sediment Control Handbook.

A3. CLEARING, GRUBBING AND STRIPPING

Measurement and Payment: Measurement of the various items of work required for Clearing, Grubbing and Stripping will not be made for payment and all items shown on the drawings and/or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for Clearing, Grubbing and Stripping for construction shall be made at the Lump Sum Price, which payment shall be full compensation for furnishing all labor, materials, equipment and incidentals required for clearing, grubbing, and/or stripping; tree removal; transport of cleared vegetation to an on-site stockpile or disposal in the landfill as designated by the OWNER; stockpiling of topsoil from stripping operations; and all other associated construction, complete and in-place in accordance with the plans and specifications.

A4. SURVEYING

Measurement and Payment: Measurement of the various items of Work required to perform record drawing surveys and surveys to confirm layer thicknesses will not be made for payment and all items shown on the drawings and/or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for performance of record drawing surveys and surveys to confirm layer thicknesses shall be made at the Lump Sum Price, which payment shall be full compensation for furnishing all labor, equipment, and incidentals required for performance of surveys, provide drawings, and sign and seal record drawings in accordance with the Contract Documents.

A5. PERIMETER BERMS, STORMWATER CHANNELS AND STORMWATER CULVERT PIPING

Measurement and Payment: Measurement of the various items of work required for constructing berms and stormwater channels will not be made for payment and all items shown on the drawings and/or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for constructing berms, stormwater channels and stormwater culverts shall be made at the Lump Sum Price, which payment shall be full compensation for furnishing all labor, materials, equipment and incidentals required for filling and compaction of soils throughout the project; installation of channel linings (rip-rap, erosion control matting); installation of culvert piping; installation of temporary access roads; and all other associated construction; complete and in-place in accordance with the Drawings and Specifications.

A6. COMPACTED CLAY LINER

Measurement and Payment: Measurement of the various items of work required for placement of the compacted clay liner (or layer) will not be made for payment and all items shown on the Drawings and /or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for the compacted clay liner shall be at the Lump Sum Price, which price and payment shall be full compensation for furnishing all labor materials, equipment, and incidentals required to obtain soil from on-site (within the Phase 4 area) or off-site borrow area(s); place and compact soil; construct a test pad or pads; construction quality control testing; and all other associated construction complete and in-place in accordance with the Contract Documents.

A7. GEOMEMBRANE

Measurement and Payment: Measurement of the various items of work required for installation of the geomembrane will not be made for payment and all items shown on the drawings and/or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for installation of the geomembrane layer shall be made at the Lump Sum Price, which payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals required for placing and seaming geomembrane on approved compacted clay layer at locations designated in the Drawings; placing and seaming geomembrane around leachate manhole for

forcemain penetration(s); placing and seaming geomembrane liner at leachate pond liner forcemain penetration; including all quality control testing and all other associated construction, complete and in-place in accordance with the Contract Documents.

A8. GEOCOMPOSITE DRAINAGE NET (GDN)

Measurement and Payment: Measurement of the various items of work required for GDN will not be made for payment and all items shown on the Drawings and/or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for construction of the GDN shall be made at the Lump Sum Price, which payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals required for placing and seaming GDN at locations designated in the plans; including all quality control testing and all other associated construction; complete and in-place in accordance with the Contract Documents.

A9. PROTECTIVE LAYER

Measurement and Payment: Measurement of the various items of work required for placement of the protective layer will not be made for payment and all items shown on the Drawings and /or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for the protective layer shall be at the Lump Sum Price, which price and payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals required to obtain aggregate/soil from off-site borrow area(s); place and compact, testing; and all other associated construction complete and in-place in accordance with the Contract Documents.

A10. TOPSOIL

Measurement and Payment: Measurement of the various items of work required for topsoiling of denuded areas will not be made for payment and all items shown on the drawings and /or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for topsoiling of denuded areas shall be at the Lump Sum Price, which price and payment shall be full compensation for furnishing all labor, equipment, and incidentals required to obtain topsoil from on-site or off-site borrow area(s) or stockpile(s); place topsoil, amend and fertilize topsoil, testing; and all other associated construction (such as screening on-site topsoil); complete and in-place in accordance with the plans and specifications.

A11. LEACHATE COLLECTION AND CONVEYANCE SYSTEM

Measurement and Payment: Measurement of the various items of work required for installation of the leachate collection and conveyance system will not be made for payment and all items shown on the drawings and/or described in the Contract Documents shall be included in the Contract Lump Sum Price.

Payment for installation of the leachate collection and conveyance system shall be made at the Lump Sum Price, which payment shall be full compensation for furnishing all labor, materials, equipment and incidentals required for installation of pipes, aggregates, geotextiles, concrete, control panel cover; force main alignment trenching and backfill, testing, and all other associated construction; complete and in-place in accordance with the Drawings and Specifications.

B. UNIT PRICE PAY ITEMS

B1. CELL EXCAVATION

Measurement and Payment: Measurement of cell excavation to establish the base grade, locating the existing cell liner tie-in, leachate pipe trenches, and sump area will be based on the measured volume per cubic yard. The volume will be determined by the CONTRACTOR's survey of pre-excavation (existing conditions) and post-excavation (base grade) conditions, and/or other measurement methods approved by OWNER.

Payment for cell excavation shall be made at the Contract Unit Price per cubic yard, which payment shall be full compensation for furnishing all labor, equipment, and incidentals required for obtaining excavating soils; separating and stockpiling soils (e.g., clay); excavating waste along existing cell tie-in; removing and stockpiling encountered bedrock, including all quality control testing and all other associated construction, complete and in-place in accordance with the Contract Documents.

B2. PERMANENT SEEDING

Measurement and Payment: Measurement of permanent seeding will be based on the CONTRACTOR's surveyed area of seeding in acres.

Payment for permanent seeding shall be made at the Contract Unit Price per acre, which price and payment shall be full compensation for furnishing all labor, equipment, and incidentals required to place seed and mulch, water, and provide maintenance to establish well vegetated surfaces for all areas denuded (disturbed) by the CONTRACTOR; application of fertilizers and/or pesticides; warranty period maintenance, and all other associated construction; complete and in-place in accordance with the plans and specifications. Note that the area within the limits of Phase 4 solid waste disposal cell do not receive seeding; the area will be covered with a rain cover.

B3. RAIN COVER

Measurement and Payment: Measurement of rain cover will be based on the CONTRACTOR's surveyed area of rain cover installation.

Payment for rain cover shall be made at the Contract Unit Price per square yard, which payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals required for placing and seaming rain cover over the solid waste disposal cell surface; including all quality control testing and all other associated construction; complete and in-place in accordance with the Contract Documents.

B4. BORROW AREA DEVELOPMENT

Measurement and Payment: Measurement of borrow area development to establish a borrow area for compacted clay liner material outside of the Phase 4 area will be based on the measured volume per cubic yard. The volume will be determined by the CONTRACTOR's survey of pre-excavation (existing conditions) and post-excavation (borrow operations completed) conditions, and/or other measurement methods approved by OWNER.

Payment for borrow area development shall be made at the Contract Unit Price per cubic yard, which payment shall be full compensation for furnishing all labor, equipment, and incidentals required for obtaining excavating soils; separating and stockpiling soils (e.g., clay); providing erosion control measures along perimeter; hauling clay materials to Phase 4 area; and providing all quality control testing and all other associated construction necessary to obtain the needed quantity of compacted clay liner material.

OWNER will assess the need for borrow area development if sufficient quantities of compacted clay liner material are not available in the Phase 4 area.

END OF SECTION

SECTION 01040

PROJECT COORDINATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The Contractor shall prepare schedules and participate in project meetings involving parties necessary to coordinate the Work.

B. Related Work Described Elsewhere

1. Section 01300 - Submittals

1.2 CONSTRUCTION MOBILIZATION

A. Prior to and during construction, coordinate use of site and facilities including mobilization areas of site, field offices, access, traffic, and parking facilities with the OWNER and others conducting work at the site under separate cover.

1.3 SCHEDULES

A. The Contractor shall submit construction progress schedules to the OWNER, ENGINEER, and others conducting work at the site in accordance with Section 01300 as necessary to coordinate site activities.

1.4 SUBMITTALS

A. When specified in individual specification sections, submit drawings, product data, samples, and other documentation in accordance with Section 01300. Revise and resubmit as required by the ENGINEER.

B. Submit applications for payment to the OWNER on EJCDC's Contractor's Application for Payment form (C-620) or other form approved by the OWNER.

C. Submit requests for interpretation of Contract Documents, and obtain instructions through the OWNER.

D. Process requests for substitutions, and change orders, through the OWNER.

END OF SECTION

SECTION 01050

SURVEYING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall provide all surveying required to complete the Work and prepare record documents.

B. Related Work Described Elsewhere:

1. Section 01700, Contract Closeout

2. Section 02225, Earthwork

1.2 QUALITY ASSURANCE

A. The CONTRACTOR shall construct all earthwork, alignments and grades to within the following tolerances:

1.	Constructed Alignments:	+/- 0.5 feet.
2.	Constructed grades (elevations) within landfill cell:	+ 0.10 feet.
3.	Constructed grades (elevations) outside landfill cell:	+/- 0.25 feet
4.	Piping and manholes:	+/- 0.01 feet.

B. Tolerances in grades do not relieve the CONTRACTOR from providing full layer thickness for the compacted clay layer and protective layer.

C. Note that per Part 1.2.A.2 above, the grades within the landfill cell shall be at or higher than the prescribed elevation, but not less than the prescribed elevation.

1.3 PROJECT RECORD DOCUMENTS

A. Maintain a complete and accurate log of control and survey work as it progresses.

B. Submit Record Documents in accordance with Section 01700.

C. Submit surveys for compacted clay liner per Section 02443 Part 1.4.C.

D. Submit surveys for protective layer per Section 02444 Part 3.4.A.

E. The CONTRACTOR’s surveyor is required to sign and seal record drawings.

1.4 SURVEY REQUIREMENTS

A. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including underground piping installed as part of this project.

2. Periodically verify layouts by same means.

B. Survey Benchmarks: Benchmark locations are noted on the Drawings.

1. The CONTRACTOR is required to provide temporary benchmarks or other control as necessary to conduct the work.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions, and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

This Section specifies administrative and procedural requirements for project meetings including, but not limited to:

A. Pre-Construction Conference

B. Progress Meetings

C. Coordination Meetings

1.3 DESCRIPTION

The CONTRACTOR will schedule and administer a preconstruction conference. The CONTRACTOR shall schedule and administer weekly construction progress meetings, and specially called meetings throughout the progress of work. The CONTRACTOR may change meeting frequency with the OWNER's approval. The OWNER reserves the right to require more frequent meetings during the project. The CONTRACTOR shall be responsible for preparing the agenda, making arrangements, preparing the meeting minutes and presiding at these meetings.

Representatives of the CONTRACTOR, Subcontractor(s), and Suppliers attending these meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.4 PRECONSTRUCTION CONFERENCE

Within fifteen (15) days after the Notice to Proceed and before starting the work, a joint meeting shall be held with representatives of the OWNER, ENGINEER, CONTRACTOR and their Superintendent, and other invited parties or government agencies which may be affected by or have jurisdiction over the project.

This meeting is intended to introduce the various key personnel from each organization and to discuss the Contract Documents, the start of construction, order of work, labor and legal requirements, approved insurance requirements, names of the major subcontractors, method of payment, submittal schedule, protection of existing facilities and other pertinent items associated with the Project. The CONTRACTOR shall bring the

construction schedule to this meeting.

The suggested agenda for the preconstruction meeting:

A. Introduction of key personnel and roles

B. Overview of project:

1. Project summary - list of definable features of work
2. Contract completion time
3. Liquidated damages
4. Guarantee of work

C. Project schedule

D. Critical work sequencing

E. Labor requirements

F. Relationship and coordination with other Contracts

G. Use of premises:

1. Rights-of-way and easements
2. Access and traffic control
3. Work and storage areas
4. Temporary facilities/utilities
5. Safety and first aid procedures
6. Security procedures
7. Posting of signs
8. Clean-up procedures
9. OWNER'S requirements

H. Procedures and processing of:

1. Field decisions
2. Change orders
3. Applications for payment
4. Partial payments
5. Record documents (including items for closeout report and record drawings)
6. Submittals (shop drawings, manufacturer’s certifications, etc.)
7. Requests for extension of Contract time

I. Construction facilities, controls and aids

J. Staking of work

K. Equipment to be used

L. Material/manufacturers/suppliers to be used

M. Major equipment/material deliveries

N. Requirements of highway department

O. On-site material storage requirements

P. Laboratory testing of materials

Q. Project inspections

R. Permit requirements

1.5 PROGRESS MEETINGS

Progress meetings will be organized and conducted by the CONTRACTOR to discuss the progress of the Contract. The CONTRACTOR, construction superintendent and appropriate subcontractors shall attend these meetings. Representatives from subcontractors performing work on the project, or supplying materials, should also attend progress meetings as necessary or as requested.

The progress meetings will be held at the CONTRACTOR's field office or at one of the OWNER's buildings on-site. The CONTRACTOR will prepare meeting minutes and distribute minutes to all attendees.

The suggested agenda for these meetings:

A. Review minutes of previous meeting.

B. Review of work progress since previous meeting.

C. Field observations, problems, conflicts.

D. Problems which impede the construction schedule.

E. Review of off-site fabrication and delivery schedules.

F. Corrective measures and procedures to regain projected schedule.

G. Revisions to construction schedule.

H. Progress schedule during next work period.

I. Coordination of schedule.

J. Status of submittals.

K. Maintenance of quality standards.

L. Pending changes and substitutions.

M. Review proposed changes for effects on schedule and other work (OWNER or under separate contract, etc.).

N. Construction schedule.

O. Critical/long-lead items.

P. Quality control testing.

Q. Other business.

1.6 COORDINATION MEETINGS

Coordination meetings should be scheduled on an as-needed basis to discuss and resolve specific construction, material delivery, quality control and other coordination issues. The CONTRACTOR will set the agenda, time and notify proposed meeting attendees prior to the meeting.

A. A coordination meeting is required for each mobilization of the geosynthetics installation crew.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall develop and distribute project submittals in accordance with procedures specified herein. The required submittals include, but are not limited to the following:

1. Construction progress schedules.
2. Proposed products list.
3. Product data.
4. Shop drawings.
5. Samples.
1. Design data.
2. Test reports.
3. Certificates
4. Permits.
5. Manufacturer's instructions.
6. Record drawings.

B. Related Work Described Elsewhere

1. All Sections.

1.2 SUBMITTAL PROCEDURES

A. Transmit electronic copies in PDF format to ENGINEER via email, and copy the OWNER contact on all correspondence.

1. For large electronic files (greater than 10 MB), files may be delivered via a file transfer website or as approved by the ENGINEER. Coordinate submission with the ENGINEER.

2. Product samples or other physical items shall be submitted to the ENGINEER and OWNER via mail or any method as approved by the ENGINEER.

B. Sequentially number the submittals. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, CONTRACTOR, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply the CONTRACTOR's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project. Coordinate submission of related items.

F. For each submittal, allow 15 days for review excluding delivery time to and from the CONTRACTOR.

G. Identify variations from Contract Documents and product or system limitations, which may be detrimental to successful performance of the completed Work.

H. When revised for resubmission, identify all changes made since previous submission.

I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit revised schedules with each Application for Payment, identifying changes since previous version.

B. Submit a chart with separate line for each major portion of Work, identifying first workday of each week.

C. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

D. Indicate estimated percentage of completion for each item of Work at each submission.

1.4 PROPOSED PRODUCTS LIST

A. Within 15 days after date of OWNER-CONTRACTOR Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

A. Product Data For Review:

1. Submit for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700.

B. Product Data For Project Close-out:

1. Submitted for the OWNER’s benefit during and after project completion.

2. Submit the number of copies, which the contract requires, plus one copy to be retained by the ENGINEER.

3. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

4. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

5. After review, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700.

1.6 SHOP DRAWINGS

A. Shop Drawings For Review:

1. Submit for review for the purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700.

B. Shop Drawings For Project Close-out:

1. Submitted for the OWNER’s benefit during and after project completion.

2. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.7 SAMPLES

A. Samples For Review:

1. Submit for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700.

B. Include identification on each sample, with full Project information.

C. Submit the number of samples specified in individual specification sections; one of which will be retained by ENGINEER.

D. Reviewed samples which may be used in the Work are indicated in individual specification sections.

E. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.8 DESIGN DATA

A. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.9 TEST REPORTS

A. Submit test reports for information for the purpose of assessing conformance with the design concept expressed in the contract documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the CONTRACTOR to ENGINEER.

B. Indicate that material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to ENGINEER.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing.

B. Indicate special procedures, conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 HEALTH AND SAFETY PLAN

A. The CONTRACTOR shall develop a Health and Safety Plan, which specifically addresses the Work to be performed, per the requirements noted in Section 01010, Summary of Work.

1.13 RECORD DRAWINGS AND REPORT

A. Submit record drawings and report in accordance with Section 01700.

END OF SECTION

SECTION 01411

QUALITY CONTROL TESTING LABORATORIES

PART 1 - GENERAL

1.1 GENERAL

A. Inspection, sampling, and testing of materials shall be as specified in the individual Specification Sections. The CONTRACTOR shall provide quality control testing services for topsoil, geotextile, GDN, geomembrane, soils and other materials not otherwise noted.

B. The CONTRACTOR is responsible for providing data on all soils (on-site or off-site) used during performance of the Work to show that the soils meet the applicable material requirements of Specification Section 02225, Earthwork and Section 02443, Compacted Clay Liner.

1.2 QUALIFICATIONS OF LABORATORY

A. Meet "Recommended Requirements for Independent Laboratory Qualification," latest edition, published by American Council of Independent Laboratories. Laboratory shall comply with applicable provisions and recommendations of current version of the following:

1. Standard of American Society for Testing and Materials (ASTM):

a. ASTM D 3740 Standard Practice for Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

b. ASTM E 329 Standard Practice for Use in Evaluation of Testing and Inspection Agencies as Used in Construction

1.3 APPROVAL OF LABORATORY

A. The CONTRACTOR shall submit the Qualifications of his proposed Quality Control Testing Laboratory(s) to the OWNER for approval within 15 days after receipt of notice to proceed and prior to initiating work or subcontractor agreements.

1.4 ROLE AND RESPONSIBILITIES

A. Independent Materials QC Laboratory:

1. The CONTRACTOR shall utilize only one organization for all geosynthetic materials quality control testing unless otherwise approved by OWNER.

2. The CONTRACTOR shall utilize only one organization for all other material quality control testing unless otherwise approved by OWNER.

B. MQC Laboratory: The CONTRACTOR shall utilize the qualified manufacturer's laboratory for all manufacturing quality control testing.

1.5 DEFINITIONS

A. Independent Laboratory: Independent quality control laboratories shall be separate from the CONTRACTOR'S organization.

1.6 TESTING EQUIPMENT CALIBRATION

A. Calibrated at maximum 12 month intervals or interval specified by applicable ASTM requirements or other approved testing entity. Calibration shall utilize devices of accuracy traceable to the National Institute of Standards and Technology (formerly the National Bureau of Standards), or the accepted values of natural physical constants.

B. Submit copy of certificate of calibration for all test equipment utilized, made by accredited calibration agency.

1.7 SUBMITTALS

A. Certificate of Compliance of Laboratory Qualifications

1. The CONTRACTOR shall submit the name and address of organization, laboratory qualifications, certificates of calibration for all test equipment, and blank test forms for the following:

a. Independent Materials Testing QC Laboratory
b. Manufacturing Quality Control Laboratory

B. TEST REPORTS

1. Promptly submit reports of inspections and tests within 5 days of test, including:

a. Date issued.
b. Project title and number.
c. Testing laboratory name and address.
d. Name and signature of inspector.
e. Date of inspection or sampling.
f. Record of temperature and weather.
g. Date of test.
h. Identification of product and specification section.
i. Location in project.
j. Type of inspection or test.

k. Results of tests and observations regarding compliance with Contract Documents.

2. Destructive tests of geomembranes: the laboratory conducting such tests will be capable of providing destructive seam test results within 24 hours of receipt of samples.

END OF SECTION

SECTION 01440

CONSTRUCTION QUALITY CONTROL

PART 1 - GENERAL

1.1 GENERAL

A. The CONTRACTOR shall be responsible for Construction Quality Control (CQC) for topsoil, geotextile, GDN, geomembrane, soils and other materials not otherwise noted, and shall establish and maintain an effective quality control system in compliance with the Contract Documents.

1. The construction quality control system shall consist of written plans, procedures, tests, observations, and organization necessary to produce an end-product, which complies with the contract requirements.

2. The system shall cover construction and manufacturing operations, both on-site and off-site, and shall be keyed to the proposed construction sequence. This includes testing of soils imported to the site.

B. The OWNER will provide Construction Quality Assurance (CQA), which will provide independent monitoring and verification of compliance with all construction and CQC requirements.

1. It is the CONTRACTOR's responsibility to coordinate the OWNER's CQA efforts with the Work.

1.2 SUBMITTALS

A. Submittals shall be made as specified in Section 01300, Submittals. The CQC organizations shall be responsible for certifying that all submittals are in compliance with the contract requirements by applying a contractor's stamp and signing the stamped certification.

B. CQC Plan: The CONTRACTOR shall submit for review, prior to start of initial construction activities (e.g., clearing), the CQC Plan proposed to implement the requirements of the Contract Documents.

1. The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.

2. Construction of the liner/leachate systems will be permitted to begin only after acceptance of the CQC Plan.

PART 2 - PRODUCTS

2.1 CONSTRUCTION QUALITY CONTROL PLAN

A. Content of the CQC Plan: The CQC plan shall include, as a minimum, the following to cover all construction and manufacturing operations, both on site and off site, including work by subcontractors, fabricators, suppliers and purchasing agents:

1. Organizational Chart: A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the plan for all aspects of the work specified. The staff shall include a Contractor Superintendent, Construction CQC Manager who shall report to the Superintendent or someone higher in the CONTRACTOR'S organization. Contractor Superintendent in this context shall mean the individual with responsibility for the overall management of the project including quality and production.

2. Resumes: The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

3. Letter of Authorization: A copy of the letter to the Construction CQC Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authority to adequately perform the functions of the Construction CQC Manager including authority to stop work which is not in compliance with the contract. The Construction CQC Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters and documents will also be furnished to the OWNER.

4. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers and purchasing agents shall be in accordance with Section 01300.

5. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, and person responsible for each test.

6. Inspection: Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

7. Deficiencies: Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected. Include a Corrective Measures Report, to be attached to daily reports

noted the deficiencies and measures taken to correct deficiencies.

8. Daily Report and Monthly Report: Reporting procedures, including proposed reporting formats.

9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the Pre-Construction Conference and subsequent progress meetings.

10. Samples of all daily reports and inspection forms.

11. The name and address of all quality control laboratories.

B. Acceptance of Plan: Acceptance of the CONTRACTOR'S plan by the OWNER is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during construction. The OWNER reserves the right to require the CONTRACTOR to make changes to the CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

C. Notification of Changes: After acceptance of the CQC plan, the CONTRACTOR shall notify the OWNER in writing a minimum of seven (7) calendar days prior to any proposed change. Proposed changes are subject to acceptance by the OWNER**.**

PART 3 - EXECUTION

3.1 CONSTRUCTION QUALITY CONTROL ORGANIZATION

A. Construction CQC Manager: The CONTRACTOR shall identify an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the CONTRACTOR.

1. Construction CQC Manager will be employed by the CONTRACTOR, except as noted in the following.

2. An alternate for the Construction CQC Manager will be identified in the Plan to serve in the event of the system manager's absence. Periods of absence may not exceed 2 weeks at any one time, and not more than 15 workdays during a calendar year. The requirements for the alternate will be the same as for the designated Construction CQC Manager.

B. CQC Organizational Staffing: The CONTRACTOR shall provide CQC staff which shall be at the site of work during progress of the work, with authority to take action necessary to maintain compliance with the contract.

C. CQC Staff: Following are the minimum requirements for the CQC staff. These minimum requirements will not necessarily assure an adequate staff to meet the CQC requirements at all times during construction. The actual strength of the CQC staff may vary during any specific work period to cover the needs of the work period. When necessary for a proper CQC staffing on-site, the CONTRACTOR will add additional staff at no cost to the OWNER. This listing of minimum staff in no way relieves the CONTRACTOR of meeting the basic requirements of quality construction in accordance with contract requirements. All CQC staff members shall be subject to acceptance by the OWNER.

1. Construction CQC Manager: The Construction CQC Manager shall demonstrate experience to inspect and test soils and aggregate materials. The Construction CQC Manager shall be assigned as system manager but may also have duties as project superintendent in addition to quality control.

2. Supplemental Personnel: A staff shall be maintained under the direction of the CQC system manager to perform all QC activities. The staff must be of sufficient size to ensure adequate QC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities. The QC plan will clearly state the duties and responsibilities of each staff member.

D. Organizational Changes: The CONTRACTOR shall obtain the OWNER'S acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

3.2 QUALITY CONTROL

A. Construction Quality Control

1. Construction Quality Control is the means by which the CONTRACTOR ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and offsite fabrication, and will be keyed to the proposed construction sequence. The controls shall be conducted by the Construction CQC Manager for all definable features of work, as follows:

a. A review of each paragraph of applicable specifications.

b. A review of the contract plans.

c. A check to verify that all materials and/or equipment to be used have been tested, submitted, and approved.

d. A check to verify that provisions have been made to provide required control inspection and testing.

e. Examination of the work area to verify that all required preliminary work has been completed and complies with the contract.

f. A physical examination of required materials, equipment, and sample work to verify that they are on hand, conform to approved shop drawing or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to verify safety requirements are met.

h. Discussion of procedures for constructing the work including repetitive deficiencies. Document construction tolerances and workmanship standards for the work.

i. A check to verify that the portion of the plan for the work to be performed has been accepted by the OWNER.

j. A check of preliminary work to verify that it is in compliance with contract requirements. Review minutes of the pre-construction, progress and coordination meetings.

k. Verification of full contract compliance. Verify required control inspection and testing.

l. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels if appropriate.

m. Resolve all differences between parties.

n. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

o. The OWNER and inspector/ENGINEER shall be notified at least 24 hours in advance of beginning any actions. A meeting shall be conducted by the Construction CQC Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the

above actions shall be documented by separate minutes prepared by the Construction CQC Manager and attached to the daily CQC report. The CONTRACTOR shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

B. Follow-up: Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work. The CONTRACTOR shall not build upon or conceal non-conforming work.

1. Erosion and sediment control measures shall be inspected in accordance with erosion and sediment control notes in the Drawings.

C. Additional Requirements: Additional control may be required on the same definable features of work if the quality of on-going work is unacceptable as determined by the OWNER; or if there are changes in the CQC staff or in the on-site production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.3 TESTING

A. Testing Procedure: The CONTRACTOR shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements and that the finished product meets design requirements. Testing includes operation and/or acceptance tests when specified.

B. The CONTRACTOR shall procure the services of an approved testing laboratory and/or establish an approved testing laboratory at the project site. Testing laboratories are subject to approval by the OWNER as specified in Section 01411, Quality Control Testing Laboratories.

C. A list of CQC tests to be performed shall be furnished by the CONTRACTOR as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.

D. The CONTRACTOR shall perform the following activities, document/record and provide the following data:

1. Verify that testing procedures comply with contract requirements.

2. Verify that facilities and testing equipment are available and comply with testing standards.

3. Check test instrument calibration data against certified standards.

4. Verify that recording forms and the test identification control number system, including all of the test documentation requirements, have been prepared.

5. Results of all tests performed, both passing and failing tests, will be recorded on the Quality Control report for the date performed. Project Manual paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. A copy of tests performed by an off-site or commercial test facility will be provided directly to the OWNER. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract.

   a. Records for the samples collected and corresponding tests shall include at a minimum:

      i) Date of collection and location (with map) of the sample.

      ii) Reference number identifying the sample.

      iii) Applicable specification section to the sample and test.

      iv) Reference number for the test to be coordinated with the sample number.

      v) Test standard (e.g., ASTM) used.

      vi) Stipulation of whether the test passed or failed the applicable test.

E. Off-Site Laboratory:

1. Capability Check: The OWNER reserves the right to check laboratory equipment in the proposed laboratory (or laboratories) for compliance with the standards set forth in the contract specifications and to check the laboratory technician’s testing procedures and techniques.

F. On-Site Laboratory: The OWNER reserves the right to utilize the CONTRACTOR’S on-site quality control testing laboratory and equipment to check the CONTRACTOR'S testing procedures, techniques, and test results at no additional cost to the OWNER.

3.4 COMPLETION INSPECTION

A. When the CONTRACTOR considers the Work ready for its intended use, the CONTRACTOR shall notify the OWNER, ENGINEER, and CQA inspector in

writing that the Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that the OWNER issue a certificate of Substantial Completion. Within a reasonable time thereafter, the OWNER, ENGINEER, CQA inspector, and CONTRACTOR shall observe the Work to determine the state of completion. If the OWNER, ENGINEER, and CQA inspector do not consider the Work substantially complete, the CQA inspector or ENGINEER will prepare and deliver to the OWNER a punch list of items to be repaired prior to issuing a certificate of Substantial Completion.

B. The punch list will be delivered to the CONTRACTOR for correction of deficiencies. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below. The CONTRACTOR shall provide to the OWNER an estimated date by which the deficiencies will be corrected.

C. An additional inspection will be made to ascertain that all deficiencies have been corrected. The process of inspections and issuing punch lists will continue until all deficiencies are corrected.

1. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for final completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.5 DOCUMENTATION

A. The CONTRACTOR shall maintain daily records of quality control operations, construction activities, and tests performed, including the work of subcontractors and suppliers. Daily CQC reports shall be on an OWNER-approved form and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:

1. Identification of CONTRACTOR/subcontractor and their area of responsibility.

2. Fusion welding, extrusion welding, equipment with hours worked, idle, or down for repair.

3. Figures illustrating the location of tests performed in the field or where samples were collected for testing.

4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

5. Material received with statement as to acceptability and storage.

6. Identify submittals reviewed, with contract reference, by whom, and action taken.

7. Off-site surveillance activities, including actions taken.

8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

9. List instructions given/received and conflicts in plans and/or specifications.

10. CONTRACTOR'S verification statement.

B. These records shall indicate a description of trades working on the project; the number of personnel working; name of site visitors; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the OWNER daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed.

C. As a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a no-work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for work performed on that day only. Reports shall be signed and dated by the Construction CQC Manager. The report from the Construction CQC Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

D. Progress reports, photographs and other documentation for contract closeout shall be provided in accordance with Specification Section 01700, Contract Closeout.

3.6 NOTIFICATION OF NONCOMPLIANCE

A. The OWNER or their representatives (e.g., CQA inspector) will notify the CONTRACTOR of any detected noncompliance with the Contract Documents. The CONTRACTOR shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the CONTRACTOR at the site of the work, shall be deemed sufficient for the purpose of notification. If the CONTRACTOR fails or refuses to comply promptly, the OWNER may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the CONTRACTOR.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall provide all labor, materials, equipment and incidentals required to provide the following:

1. Temporary Utilities: Electricity, telephone service, water, and sanitary facilities.

2. Temporary Controls: Enclosures and fencing, protection of the Work, and water control.

B. Related Work Described Elsewhere

1. Section 01700 - Contract Closeout

PART 2 - PRODUCTS

2.1 OPTIONAL FIELD OFFICE

A. Office: Weather tight, with lighting, electrical outlets, heating cooling and ventilating equipment, and equipped with sturdy furniture. Locate office where directed by the OWNER.

B. Construction: Portable or mobile buildings securely fixed to foundations with steps and landings at entrance doors.

1. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove at completion of Work.

2. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.

3. Exterior Materials in Offices: Weather resistant.

4. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.

5. Fire Extinguishers: Appropriate type fire extinguishers at each office and each storage area.

6. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

C. Environmental Control

1. Heating, Cooling and Ventilating for Offices: Automatic equipment to maintain comfortable conditions.

D. Telephone Service

1. Mobile/cell service is adequate; a hard-wired system is not required.

E. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.

F. Installation:

1. Installation of field office is optional. However, if CONTRACTOR plans to install field office, then install for occupancy within 15 days after Notice to Proceed.

2. Parking: Gravel lot.

3. Employee Residential Occupancy: Not allowed on OWNER's property.

G. Maintenance And Cleaning:

1. Periodic cleaning and maintenance for office and storage areas.

2. Maintain approach walks free of mud, water, and snow.

H. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to pre-construction conditions at a minimum including seeding, gravel and grading.

2.2 TEMPORARY ELECTRICITY

A. CONTRACTOR to provide temporary electrical service during construction at no additional cost to OWNER, if required for health and safety or other reasons during performance of the Work.

2.3 TEMPORARY WATER SERVICE

A. Provide, maintain and pay for suitable quality potable water service as required for CONTRACTOR's needs at time of project mobilization.

B. Non-potable water from existing wells may be used with OWNER's approval and only at designated wells and/or within designated timeframes.

2.4 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

2.5 SMOKING: Smoking is not allowed on the premises. The CONTRACTOR shall inform employees and subcontractors of the policy and enforce the no smoking policy within their project limits.

A. OWNER reserves to right to ban from the landfill property CONTRACTOR's personnel or subcontractors in violation of the policy.

2.6 FENCING

A. Additional fencing, if required by the OWNER as a temporary control during construction, will be commercial grade chain link fence.

2.7 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment for dewatering as necessary for the Work.

2.8 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

2.9 EROSION AND SEDIMENT CONTROL

A. Provide and maintain erosion control measures per plan.

B. Provide additional measures as needed to maintain Work.

C. Remove erosion control measures with OWNER's approval.

2.10 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

2.11 SECURITY

A. The CONTRACTOR shall provide security and facilities necessary to protect the Work and the CONTRACTOR's construction facilities from unauthorized entry, vandalism, or theft, to the extent practical.

B. Coordinate with OWNER's security program. Note that the OWNER's security personnel and/or system are not responsible for CONTRACTOR's facilities or work.

2.12 ACCESS ROADS

A. Designated existing on-site access roads shall be used for construction traffic.

B. Provide means of removing mud from vehicle wheels before entering paved roadways.

C. Provide temporary access roads as needed to access work area.

2.13 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas utilized for construction free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

2.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, prior to Final Application for Payment inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition or better. Restore permanent facilities used during construction to original condition or better.

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01620

STORAGE AND PROTECTION OF MATERIAL

PART 1 - GENERAL

1.1 GENERAL

A. Store and protect materials in accordance with manufacturer's recommendations and requirements of Specifications.

B. The CONTRACTOR shall make all arrangements and provisions necessary for the storage of materials and equipment. All excavated materials, construction equipment, and materials and equipment to be incorporated into the work shall be placed so as not to injure any part of the work or existing facilities and so that free access can be had at all times to all parts of the work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly and compactly stored in locations that will cause a minimum of inconvenience to other contractors, landfill operations, public travel, and adjoining properties. Arrange storage in a manner to provide easy access for inspection.

C. Areas available on the construction site for storage of material and equipment shall be as shown or approved by the OWNER. Storage sheds and/or trailers shall be located within the property at locations designated by the OWNER during the pre-construction meeting.

D. Materials and equipment which are to become the property of the OWNER shall be stored to facilitate their inspection and insure preservation of the quality and fitness of the work, including proper prevention against damage by freezing and moisture. They shall be placed inside storage areas unless otherwise acceptable to the OWNER.

E. Lawns, grass plots or other private property shall not be used for storage purposes without written permission of the OWNER and person in possession or control of such premises.

F. The CONTRACTOR shall be fully responsible for loss or damage to stored materials and equipment.

G. Do not open manufacturers’ containers until time of installation unless recommended by the manufacturer or otherwise specified.

H. Do not store products in the structures being constructed unless approved in writing by the OWNER.

1.2 UNCOVERED STORAGE

A. The following types of materials may be stored out-of-doors without cover:

1. Bedding/backfill materials.
2. Reinforcing steel.
3. Piping/conduit.
4. Precast concrete items.
5. Castings.
6. Structural steel.

B. Store the above materials (excluding bedding/backfill materials) on wood blocking so there is no contact with the ground.

1.3 COVERED STORAGE

A. The following types of materials may be stored out-of-doors if covered with material impervious to water and ultraviolet light:

1. Rough lumber.
2. Geosynthetic materials
3. Geotextile fabrics.
4. Framing materials.

B. Tie down covers with rope and slope to prevent accumulation of water on covers. Maintain covers to provide continuous protection from damage.

C. Store materials on wood blocking in a manner to prevent moisture damage.

1.4 FULLY PROTECTED STORAGE

A. Store products not named above in temporary buildings or trailers which have a concrete or wooden floor, a roof, and fully closed walls on all sides.

B. Provide heated storage space for materials which would be damaged by freezing.

C. Protect mechanical and electrical equipment from being contaminated by dust, dirt and moisture.

1.5 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.

2. Required environmental conditions are maintained on continuing basis.

3. Products exposed to elements are not adversely affected.

1.6 PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment, materials, and surfaces.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall provide all labor, materials, equipment and incidentals necessary to closeout the project as specified herein. Activities may include, but are not limited to final cleaning, preparation of record documents, operations and maintenance documents, delivery of spare parts, and transfer of warranties.

B. Related Work Described Elsewhere

1. All Sections.

1.2 CLOSEOUT PROCEDURES

A. The CONTRACTOR shall submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for OWNER'S review.

B. Provide submittals to OWNER that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute final cleaning prior to demobilization.

B. Clean equipment and fixtures with cleaning materials appropriate to the surface and material being cleaned. Clean filters of operating equipment, clean debris from manholes, and clean the site.

C. Remove waste and surplus materials, rubbish, and construction facilities installed by the CONTRACTOR from the site.

D. Verify that grading and seeding of all disturbed areas has been accomplished to the satisfaction of OWNER. Verify that erosion and sediment control structures removed or damaged during performance of the Work have been repaired or restored to the satisfaction of OWNER.

1.4 PROJECT RECORD DOCUMENTS

A. Maintain on site one clean set of the Contract Documents on-site.

B. Maintain a set of Contract Documents with mark-ups of revisions to the Work and actual work performed. Documents are to include:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

C. Ensure entries are complete and accurate, enabling future reference by OWNER.

D. Store record documents separately from documents used for construction.

E. Record information concurrent with construction progress.

F. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

G. Record Drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of underground piping and appurtenances, referenced to permanent surface improvements.

2. Field changes of dimension and detail.

3. Details not on original Contract drawings.

4. The CONTRACTOR shall provide Record Drawings for, but not limited to the following:

a. Geomembrane Record Drawings: The CONTRACTOR shall prepare a geomembrane record drawing. At a minimum, the draft record drawing shall be submitted to the OWNER and ENGINEER for review and approval within 15 days after completion of the geomembrane installation. This drawing shall be signed and sealed by a surveyor. The minimum scale is 1" = 50', and the maximum sheet size is 24" X 36". The following information is mandatory:
i) 2-foot contours (obtained from a survey of the top of the compacted clay layer or top of geomembrane).
ii) Location and size of all panels installed and seam welds.
iii) Label all panel and roll numbers.

iv) Label destructive sample numbers and geomembrane repair numbers.
v) Label and locate the location of each repair, cap strip, liner penetration, pipe boot, and destructive sample.
vi) Horizontal and vertical coordinates of the anchor trench along sides of the cell and along the tie in points of the existing liner/leachate systems. Coordinates shall be provided at 100 linear foot intervals at minimum and at all points of deflection.
vii) Slopes and breaks in grade.

b. Submit a geocomposite drainage net (GDN) panel record drawing to the OWNER and ENGINEER for review and approval. The record drawing shall show the location of repairs, replacements, overlaps, and other additional work performed on the GDN during installation. This drawing shall be signed and sealed by a surveyor, and shall include the same mandatory information as provided for the geomembrane record drawing. The 2-foot contours may be obtained from a survey of the top of the GDN corresponding to the bottom of the protective layer.

c. Submit record drawings of the Phase 4 cell construction at final grade (topsoil or protective layer installed). Submit a draft of the final grade record drawing to the OWNER and ENGINEER for review prior to application for final payment. The following information is mandatory:

i) 2-foot contours and spot elevations at relative high and low points. The elevations are based on a survey of the landfill's final grade after installation of topsoil, channel linings, and protective layer in the material's respective areas. Rain cover shall be shown on the drawing, but a survey of the top is not required.
ii) Final grades to all areas excavated and/or filled during the work.
iii) Location and size of pipes (leachate gravity and forcemain pipes).
iv) Inverts of gravity pipes connected to the work (e.g., invert of 48-inch culvert).
v) Location and names of all structures (leachate manhole, pump controls, valve boxes, controls pad corners, etc.).
vi) Location of electrical conduit and connection point.
vii) Limits of cell including horizontal and vertical coordinates of the anchor trench and tie-in to existing liner/leachate systems. Coordinates shall be provided at 100 linear foot intervals at minimum and at points of deflection.
viii) Limits of rip-rap, gravel, or other surface treatments.

ix) Slopes and breaks in grade.

d. Record drawings shall be provided in draft and final form as submittals.

H. Compacted Clay Liner (Layer) and Protective Layer thickness drawings. In addition to data noted in the layers respective specifications, the drawings shall include a grid or tickmarks denoting the horizontal coordinates, north arrow, and surveyor seal and signatures.

I. Provide Record Drawings in hard copy and electronic (AutoCAD) formats.

J. Final Documentation Report: At the completion of the work, the CONTRACTOR shall submit to the OWNER and ENGINEER a signed Final Documentation Report. Submit the draft Final Documentation Report for review prior to application for final payment. At a minimum, the Final Documentation Report shall include:

1. Written summaries of all construction activities in the form of progress reports. Progress reports shall be prepared on a weekly basis unless a different time interval is agreed to by the OWNER.

2. Observation logs and test data sheets including sample location plans (plans showing where tests were conducted) and supporting field and laboratory test results. At a minimum, data shall be included for the geomembrane, GDN, soils (e.g., density and permeability testing), as well as electrical connections and pressure piping.

   a. Each test and location will have an individual designation (identification) that will be shown on the sample location plans and in the test results.

3. Construction corrective measure reports noting the deficiencies and measures taken to correct them.

4. Changes from design and material Specifications.

5. Photo-documentation: The CONTRACTOR shall provide photographs that will serve as a pictorial record of work progress, problems, and mitigation activities. The photographs shall contain color prints presented in chronological order. Photographs shall be collected on a weekly basis unless a different time interval is agreed to by the OWNER.

   a. Photographs shall be cross-referenced with observation and test reports and/or problem identification and corrective measure reports.

1.5 WARRANTIES AND BONDS

A. Provide two notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

END OF SECTION

SECTION 02110

CLEARING, GRUBBING, AND STRIPPING

PART 1 - GENERAL

Clear, grub, strip and stockpile existing topsoil as necessary to conduct the work within the limits of construction.

1.1 DEFINITIONS

A. Clearing: Clearing shall consist of removing vegetation, brush, and rubbish that exists within the construction limits.

B. Grubbing: Grubbing shall consist of removing and disposal of stumps, roots larger than 1 inch in diameter, and matted roots from within the construction limits.

C. Stripping: Stripping shall consist of removing the layer of organic material or topsoil existing within the limits of work to reach predominantly inorganic soil.

1.2 SUBMITTALS (Not applicable)

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials for the protection of existing vegetation to remain shall conform to the requirements of the latest version of the Virginia Erosion and Sediment Control Handbook.

PART 3 - EXECUTION

3.1 GENERAL

The CONTRACTOR shall exercise care as not to damage existing structures within the construction area during site clearing and construction activities. Damaged structures shall be repaired by the CONTRACTOR immediately at no additional cost to the OWNER.

3.2 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be removed completely below the original ground surface, including stump and root system.

3.3 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris that are not suitable for foundation purposes, shall be removed to a depth of not less than 12 inches below the final surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract. Depressions made by grubbing shall be filled with suitable soil material and compacted to ensure the surface conforms with the original adjacent surface of the ground, if the area is not to be excavated or filling as part of the Work.

3.4 TOPSOIL STRIPPING

Strip and stockpile topsoil in area(s) designated by the OWNER so that topsoil will be available for potential future use and will not interfere with other activities.

3.5 PROTECTION

A. The limits of the areas to be cleared and grubbed shall be marked by means of stakes, flags, or other suitable methods. Trees to remain shall be clearly marked. Clearing and grubbing shall be conducted in such a manner as to prevent damage to existing trees, plant growth, and features outside disturbed areas to remain as final landscaping. Any existing trees that are damaged shall be replaced with trees meeting the OWNER’s approval.

B. Protect benchmarks, survey control points, and existing structures from damage or displacement.

3.6 DISPOSAL OF MATERIALS

The CONTRACTOR shall dispose of cleared and grubbed vegetative matter off-site, or on-site as approved by the OWNER.

3.7 DUST CONTROL

The CONTRACTOR shall be responsible for controlling objectionable dust by their operation of vehicles and equipment during all land disturbing activities. The CONTRACTOR shall use methods, subject to the OWNER's approval, that keeps airborne dust to a minimum and to the satisfaction of the OWNER. Should the CONTRACTOR’s equipment not be suitable to dust control methods, the OWNER shall require the CONTRACTOR to provide alternate methods and/or equipment at no additional expense to the OWNER.

END OF SECTION

SECTION 02225

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work in this section includes all labor, materials, equipment, construction quality control (CQC) testing, and incidentals required to perform earthwork for site grading. Earthwork includes, but is not limited to the following:

1. Excavation, filling, backfilling and compacting earthen materials to achieve final grades for all related earthen features. This includes backfilling of trenches and anchor trenches; sheeting and shoring; construction of subbase, subgrade, base grade, compacted clay liner, dewatering; general backfilling and compacting, and grading around structures; segregating, stockpiling, screening, and other material processing of excavated materials for on-site use; disposing of earth materials, as required to complete construction, and associated features shown on the PLANS.

2. Erosion and sediment control, construction of temporary and permanent access roads, diversion berms, storm drainage structures and related structures as shown on the PLANS and as specified herein.

3. CONTRACTOR'S Construction Quality Control (CQC) observations, field testing, sampling, laboratory testing of earthwork, as specified herein, to establish compliance with material and performance requirements.

4. Blasting to facilitate excavation of rock, as described in Section 02316, Rock Removal.

B. No classification of type of excavated material will be made. Excavation includes all soil, boulders, waste materials (if encountered), rock, organic material and other material from areas to be graded, regardless of type, character, composition, moisture, or condition thereof.

C. CONTRACTOR is responsible for all construction layouts and staking.

D. Where rock is encountered within the footprint of the landfill, it shall be removed to a minimum depth of 2 feet below the Base Grade elevation and backfilled with Controlled Fill to the Base Grade elevation as shown on the Drawings in preparation for the Compacted Clay Liner.

1.2 DEFINITIONS

A. Excavation means the removal of soil, waste, rock, debris and other materials to the proposed grading limits indicated on the PLANS, and as required to excavate within designated borrow areas to supply the required volume and quality of soil for the construction.

B. Unauthorized excavation consists of removal of materials beyond indicated areas without specific direction of the OWNER or ENGINEER. Unauthorized excavation shall be at CONTRACTOR'S expense. Unauthorized excavations shall be backfilled and compacted as specified for authorized excavations at no additional cost to the OWNER.

C. Additional Excavation: When excavation has reached required elevations, notify the ENGINEER, who will make an inspection of conditions. If the ENGINEER determines that bearing materials at required elevations are unsatisfactory, continue excavation until satisfactory bearing materials are encountered. Replace excavated material with suitable fill material as directed by the ENGINEER.

D. Maximum Dry Density: Maximum dry weight in pounds per cubic foot (pcf) of a specific soil material as determined by Standard Proctor ASTM D698.

E. Optimum Moisture Content: The moisture content at which the maximum dry density of a soil material is determined by Standard Proctor ASTM D698.

F. Fill material is soil used for filling or backfilling of areas including trenches, structural areas, or slopes to meet a grade, depth, or layer thickness.

G. Filled areas are areas that have received trench backfill, structural fill or embankment materials, placed and compacted as specified herein.

H. Open areas are all areas other than the following: paved areas, areas within the public right-of-way, and areas upon which structures are to be constructed.

I. Reference Standards: Test methods widely used by the industry including those methods published by ASTM International.

1.3 SUBMITTALS

A. Sheeting, shoring and bracing shall be designed and signed by a registered professional ENGINEER and submitted for approval.

1.4 SAFETY

A. All excavation guidelines shall comply with CONTRACTOR’S Site Health and Safety Plan and the applicable requirements as stated in the:

1. OSHA excavation safety standards.

2. State and County construction safety regulations.

3. Trench safety guidelines as specified by the Landfill Gas Division of the Solid Waste Association of North America (SWANA).

4. Contact “Miss Utility” to obtain clearance prior to any excavation work.

1.5 PROJECT CONDITIONS

A. Site Information: The CONTRACTOR shall be responsible for having determined to his/her satisfaction, prior to the submission of the bid, the conformation of the ground, the characteristics and quality of the substrata, the types and quantities of materials to be encountered, the nature of the rock and groundwater conditions, the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract.

1. Additional test borings, soil testing, and other exploratory operations may be performed by the CONTRACTOR, at the CONTRACTOR'S option; however, the OWNER will not pay for such additional exploration.

B. Existing Structures: Shown on the PLANS are certain surface features and underground structures adjacent to and within the work area. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of the CONTRACTOR. The CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from damage by the CONTRACTOR. If they are broken or damaged, they shall be restored immediately by the CONTRACTOR at his expense.

C. Protection of Persons and Property

1. Barricade open excavations or trenches occurring as part of this work and post warning signs or lights, as appropriate.

2. CONTRACTOR shall plan and conduct operations to prevent damage or disturbance to existing structures and utilities, buried utilities, existing monitoring wells, paved roads, signs, trees and bench marks.

3. Protect existing slopes, embankments, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

4. Failure of ENGINEER to order the use of bracing or sheeting or shoring shall not in any way or to any extent relieve the CONTRACTOR of any responsibility concerning the conditions and safety of excavations or of their obligations under this Contract.

5. Work is restricted to the area provided for CONTRACTOR'S use.

6. Side slopes shall be maintained in stable condition under all normal anticipated weather conditions for the period that the excavation will be open. The CONTRACTOR shall regrade side slopes to be a more stable configuration if so directed by ENGINEER.

1.6 QUALITY CONTROL

A. All materials and labor furnished under this section shall comply with OSHA, ASTM, VDOT, NEC, ANSI and other applicable Federal, State and County codes and regulations including revisions to the date of the Contract.

B. The CONTRACTOR shall provide CQC.

C. Use adequate number of skilled workmen who are thoroughly trained and experienced in the specified requirements and the methods needed for proper performance of the work in this Section.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General Fill:

1. General Fill shall be inorganic soil that is not excessively wet or saturated, free of stone, rock or gravel larger than three (3) inches in any dimension, and free of debris, waste, frozen materials, vegetation, organic materials, roots, and other deleterious matter. The satisfactory excavated soil materials shall be capable of maintaining its stability on all slopes. Excess or unsatisfactory material shall be removed and disposed as directed by the ENGINEER to the designated on-site stockpiles.

2. General Fill shall be used for backfilling and filling as shown on the PLANS, and for areas as otherwise directed by the ENGINEER.

B. Controlled Fill:

1. Controlled Fill refers to select inorganic soil materials that are classified as CL, CL-ML, SM, SP, SC or SW as defined by Unified Soil Classification System, or otherwise approved by the ENGINEER. The ENGINEER or OWNER shall designate areas on-site to separately stockpile potential Controlled Fill materials.

2. Controlled Fill shall be used in the last five (5) feet of filling for access roads and building structures (if any) outside of the limits of waste.

3. Controlled Fill is also referred to as select excavated material, select material, and electrical bedding material on the electrical portions of the Drawings if provided.

C. Compacted Clay Liner: refer to Section 02443, Compacted Clay Liner.

D. Topsoil

1. Soil material per Specification 02900, Landscaping.

E. Trench Backfill

1. Provide general fill unless otherwise noted on the drawings or in pipe related specifications.

F. Bedding and Haunching for Pipe and Pipe Structures Outside the landfill Footprint

1. Bedding and haunching for pipe shall be ½-inch to ¾-inch size stone granular material, unless otherwise shown.

2. Bedding for manholes and vaults shall be ½-inch to ¾-inch size stone granular material, unless otherwise shown.

G. Other Materials: All other materials, not specifically described or noted on the drawings, but required for proper completion of the work shall be selected by the CONTRACTOR and approved by the ENGINEER.

PART 3 – EXECUTION

3.1 PREPARATION

A. Site Clearing, Grubbing, and Stripping:

1. Prior to construction, all areas to receive fill or to be excavated shall be cleared and grubbed of vegetation, roots, organic soil, peat, trash, debris, or other deleterious materials as specified in Section 02110, Clearing, Grubbing, and Stripping.

B. Dewatering

1. The CONTRACTOR shall at all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory foundation condition until the fill, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels.

2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottom, and soil changes detrimental to stability of subgrades and foundations. Subgrade soils, which become soft, loose, "quick", or otherwise unsatisfactory for support of structure as a result of inadequate dewatering or other construction methods shall be removed and replaced by crushed stone as required by the ENGINEER at the CONTRACTOR's expense. The bottom of excavations shall be rendered firm and without standing water before placing structures or pipes. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

3. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

4. Disposal of Water Removed by Dewatering System:

   a. Dispose of water in such a manner as to cause no inconvenience to the OWNER, the ENGINEER, or others involved in work about the site.

C. Construction Quality Control (CQC)

1. CQC testing and observations shall be provided by a qualified testing firm that is approved by the OWNER.

3.2 EXCAVATION

A. General:

1. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the PLANS.

2. Excavation work shall be performed in a safe and proper manner with appropriate precautions being taken against hazards and in accordance with the Health and Safety Plan. Excavations shall provide adequate working space and clearances for the work to be performed therein. If walls of the excavation cannot be kept stable, the excavation shall be properly shored and braced.

3. CONTRACTOR may need to screen, crush, or segregate excavated material during excavation to remove oversize particles and rock, and to set aside material that will be suitable for use in construction.

4. If subgrade "pumping" is encountered during excavation, perform the following:

   a. Excavate and remove the underlying unsuitable material to a minimum depth of 12 inches.

   b. Proof-roll and compact by appropriate heavy equipment for at least 6 passes and approved by the ENGINEER.

   c. Backfill with General Fill or Controlled Fill material as directed by the ENGINEER and compact to a stable condition approved by the ENGINEER.

5. Excavation shall conform to the limits indicated on the PLANS and as specified herein. This work shall include shaping, sloping, grading and other work necessary in bringing the site to the required grade, alignment, and cross-section.

6. Unsatisfactory materials shall be removed to the required depth and replaced to the satisfaction of the ENGINEER with General Fill or Controlled Fill. Unsatisfactory materials shall be removed and disposed of off-site.

7. Satisfactory excavated materials shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered.

3.3 TRENCH EXCAVATION FOR DRAINAGE STRUCTURES

A. Trench width shall be minimized to the greatest extent practical but shall conform to the following:

   1. Sufficient to provide room for installing, jointing, and inspecting piping, but in no case wider at top of pipe than pipe barrel outside diameter plus 18 inches unless otherwise shown on drawings or as approved by the ENGINEER.

   2. Trench enlargements at pipe joints.

   3. Sufficient for sheeting, bracing, sloping, and dewatering.

   4. Sufficient to allow thorough compacting of backfill adjacent to bottom half of pipe.

B. Excavate trenches to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil.

1. For pipes less than 6 inches in nominal size, do not excavate beyond indicated depths. Excavate bottom cut to accurate elevations and support pipe on undisturbed soil.

2. For pipes 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe. At each pipe joint, dig bell holes to relieve pipe bell of loads and ensure continuous bearing of pipe barrel on bearing surface.

C. No more than 300 feet of trench within landfill area may be opened in advance of pipe laying operations at one time unless approved by the ENGINEER.

D. All trenches shall be constructed in a uniform grade, and free of standing water. The CONTRACTOR shall be responsible for maintaining these conditions. Subgrade soils that become soft, loose, or unsatisfactory as a result of inadequate dewatering and cannot be stabilized or recompacted shall be removed and replaced by VDOT No. 57 stone or an approved equal at the CONTRACTOR's expense.

E. Excavation for appurtenances shall maintain a minimum clearance of 12 inches between their outer surfaces and the face of the excavation, or sheeting, if used.

F. Document the location, elevation, size, material, type and function of all new subsurface installations, and utilities encountered during the course of construction and include this information as part of the Record PLANS.

3.4 STABILITY OF EXCAVATIONS

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction including OSHA.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of excavated material. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations during period excavations will be open. Extend shoring and bracing as excavation progresses.

3.5 STORAGE OF EXCAVATED AND BORROW MATERIALS

A. Stockpile materials where directed by the OWNER. Place, grade, and shape stockpiles for proper drainage.

1. Locate and retain excavated soil and backfill materials away from edge of excavations. No excavated materials or other construction materials shall

be placed within thirty (30) feet of the edge of pavement of any public road.

2. Comply with all erosion and sediment control requirements of State and local authorities.

3.6 BACKFILL AND FILL

A. General: Place soil material in layers to required elevations, for each area classification listed below, using materials specified in Part 2 of this Section.

1. For general site grading, use General Fill or Controlled Fill unless otherwise indicated.

2. Do not backfill trenches until tests and inspections have been made. Use care in backfilling to avoid damage or displacement of pipe systems. Work which is covered or concealed without the knowledge and consent of the ENGINEER shall be uncovered or exposed for inspection at no cost to the OWNER. Partial backfill may be made to restrain the pipe during pressure testing if pressure test is required. No more than 50 feet of trench with pipe in place shall be partially backfilled at any time.

B. Backfill excavations as promptly as work permits.

3.7 PLACEMENT AND COMPACTION

A. General:

1. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or scarify surfaces so that fill materials will bond with existing surfaces.

2. Waste or unsuitable materials shall not be used as backfill materials.

3. Place backfill and fill materials in horizontal layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated equipment. Thickness of layers may be increased or decreased provided the equipment and methods used are proven by field density and moisture content testing, or test pads, to be capable of compacting thicker or thinner layers to specified densities and moisture range, and only as approved by the ENGINEER.

4. Before compaction, moisten or aerate and process (e.g. disking and mixing) each layer as necessary to provide suitable moisture contents. Compact each layer to required percentage of maximum dry density or relative dry density and moisture range for each area classification. Do

not place backfill or fill material on surfaces that are submerged, soft, muddy, frozen, or unstable.

5. Recompact areas or lifts if soil density and moisture tests indicate inadequate compaction and/or moisture. No additional compensation shall be given to the CONTRACTOR due to re-working of failed areas. The extent of area for repair shall be determined by the ENGINEER.

6. Place backfill and fill materials evenly adjacent to structures or piping to required elevations. Prevent wedging action of backfill against structures or displacement of piping by carrying material uniformly around structure or piping to approximately same elevation in each lift.

B. Moisture Control: Where subgrade or fill material must be moisture conditioned before compaction:

1. Uniformly apply water to surface of subgrade or fill material. Apply water as necessary to prevent free water from appearing on surface during or subsequent to compaction operations. The CONTRACTOR shall process soil materials so that moisture is uniformly mixed into soils.

2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density and moisture range. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by disking, harrowing, or pulverizing until moisture content is reduced uniformly to a satisfactory value.

C. Compaction Requirements: Compact fill materials and aggregates not less than the following percentages of maximum dry density, unless otherwise approved by the ENGINEER, as follows:

1. Before placement of soil or other materials on existing grade, the existing grade subgrade compaction shall be achieved by appropriate heavy compaction equipment with a minimum of 6 passes and approved by the ENGINEER, unless otherwise specified.

2. General Fill: Minimum 90 percent.

3. Controlled Fill: Minimum 95 percent compaction within 4 percent of optimum of moisture content.

4. Compacted Clay Liner: Refer to Section 02443, Compacted Clay Liner.

5. Topsoil shall receive limited compaction to minimize erosion, yet should not inhibit plant growth and root penetration.

6. Pipe: Bedding and Haunching Aggregates: Tamp with appropriate equipment to maximum obtainable density as field-determined by the CONTRACTOR.

7. Trench backfill shall have a minimum 92 percent compaction within 4 percent of optimum moisture content.

D. Construction Quality Control: Testing in accordance with Table 1-02225 and Table 2-02225.

3.8 GRADING

A. Perform grading operations so that the excavation will be well drained at all times. Maintain drainage ditches and keep them open and free from soil, debris, and leaves until final acceptance of the work. Finish all grading on neat, regular lines conforming to the sections, lines, grades and contours shown on the PLANS or if not shown in accordance with the criteria set forth hereinafter. Perform grading work in proper sequence with all other associated operations.

B. Structures and pavement: bring finished subgrade to the elevation as shown on the drawings. Bring entire areas to the finished subgrade elevation before excavating for footings.

C. Uniformly grade all areas disturbed by the project, at trench locations, excavated and fill areas and adjacent transition areas so that finished surfaces are at the proposed grade or are approximately at preexisting grades, adjusted as required to provide positive drainage.

3.9 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density and moisture range prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.10 DISPOSAL OF EXCESS SOIL AND WASTE MATERIALS

A. Dispose of excess soil and waste materials to designated areas on-site as directed by the OWNER.

3.11 FINISHING WORK

A. The CONTRACTOR shall maintain all final surfaces to be free of ruts, depressions, and damage resulting from the hauling and handling of any material, equipment, tools, etc.

B. All drainage structures shall be constructed and maintained as necessary along the completed section.

C. Unless otherwise specified by the ENGINEER, the elevation of all constructed grades, structures, and pipes shall be in accordance with Specification Section 01050, Surveying, Part 1.2.A.

However, the thicknesses of all liner/leachate system components (e.g., compacted clay layer and protective layer) are minimum values.

D. After berms, ditches, swales, shoulders, and embankments are completed, the disturbed areas shall be finish graded. Any lumber, undesirable materials, and rocks larger than the 3 inches in size shall be removed from the surface immediately and the surface shall be prepared for final landscaping.

E. Paved and grass areas disturbed by the operations under this section shall be restored as indicated on the PLANS and/or specified in the Specifications.

TABLE 1-02225
PRECONSTRUCTION EARTH MATERIALS TESTING

Granular Materials (Bedding for Pipe, Gravel Roads)			
Test	Method	Minimum Frequency	Comment
Sulfate Soundness	ASTM C88	1 per source	Provided by supplier
Percent Finer than No. 200 Sieve	ASTM C117	1 per source	Provided by supplier
LA Abrasion	ASTM C131/C535	1 per source	Provided by supplier
Sieve Analysis	ASTM C136	1 per source	Provided by supplier
Fine-Grained Soils (General Fill, Controlled Fill, Trench Backfill)			
Test	Method	Minimum Frequency	Comment
Water Content	ASTM D2216	1/5000 yd^3/soil type	ENGINEER may reduce frequency if results are consistent and a single source used
Particle Size Analysis	ASTM D422	1/5000 yd^3/soil type	ENGINEER may reduce frequency if results are consistent and a single source used
Standard Proctor Compaction	ASTM D698	1/5000 yd^3/soil type	ENGINEER may request additional tests if inconsistencies in field testing (noted in Table 2 below) are observed
Percent Finer than No. 200 Sieve	ASTM D1140	1/5000 yd^3/soil type	May be eliminated if same information provided by ASTM D422
Atterberg Limits	ASTM D4318	1/5000 yd^3/soil type	ENGINEER may reduce frequency if results are consistent and a single source used

Note: If similar soils are used for various material/layer types, then preconstruction soil test results may be combined for multiple material/layer types.

TABLE 2-02225
EARTH MATERIALS CQC TESTING

Granular Materials (Bedding for Pipe, Gravel Roads)			
Test	Method	Minimum Frequency	Comment
Percent Finer Than No. 200 Sieve	ASTM C117	1/1000 yd^3 or 1 per 1000 linear feet of trench/road	Temporary access roads are excluded
Sieve Analysis	ASTM C136	1/1000 yd^3 or 1 per 1000 linear feet of trench/road	Temporary access roads are excluded
Fine-Grained Soils (General Fill, Controlled Fill, Trench Backfill)			
Nuclear Density Test	ASTM D2922	5 tests/acre/lift or 1 per 500 linear feet of trench	Requirements are reduced to 1 test per acre for General Fill
Water Content (Nuclear Method)	ASTM D3017	5 tests/acre/lift or 1 per 500 linear feet of trench	

END OF SECTION

SECTION 02233

AGGREGATES

PART 1 - GENERAL

1.1 SUMMARY

A. The CONTRACTOR shall furnish all labor, material, and equipment necessary for pipe bedding aggregates, erosion control aggregates, and other miscellaneous work as shown in the DRAWINGS and as specified herein.

B. Related Work Specified Elsewhere:

1. Section 02225 – Earthwork

2. Section 02270 – Erosion and Sediment Control

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced in the text:

A. Department of Transportation (VDOT) Road and Bridge Specifications, current edition at time of construction

B. ASTM International, Standard Methods and Practices

1.3 SUBMITTALS

A. Prequalification:

Submit the material source, gradation, classification, descriptions, and material specifications certified by the supplier to the ENGINEER for approval.

B. Approval of Material Source:

The source of the material to be used for producing aggregates shall be selected not less than thirty (30) days prior to the time the material will be required in the work. Any changes in the source of materials shall be reported to the ENGINEER immediately. The ENGINEER shall approve the new source. The CONTRACTOR shall be fully responsible for any delays in construction due to changes in material sources.

C. Certificate of Compliance: The CONTRACTOR shall submit to the ENGINEER for approval before procurement a Certificate of Compliance from the manufacturer that the supplied materials meet the specifications herein.

1.4 QUALITY CONTROL

Perform work in accordance with the VDOT Road and Bridge Specifications.

PART 2 - PRODUCTS

2.1 GENERAL

A. Aggregates shall consist of clean, sound, durable particles of crushed stone, or gravel, and screenings. The CONTRACTOR shall obtain materials that meet the specifications and can be used to meet the grade and smoothness requirements specified herein, after all compaction and proof-rolling operations have been completed. Slag shall not be used. The aggregates shall be free of material finer than the No. 200 sieve (per ASTM D422), vegetative matter, and other objectionable materials or coatings.

B. Aggregate shall have:

1. A loss of density not greater than 10 percent of the weighted average at five cycles when tested for soundness.

2. A percentage of wear not exceeding 40 percent after 500 revolutions as determined by the requirements of VDOT Road and Bridge Specifications.

The percentage of flat and/or elongated particles shall not exceed 20 in the fraction retained on the 1/2-inch sieve and in the fraction passing the 1/2-inch sieve. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. When the aggregate is supplied from more than one source, aggregate from each source shall meet the requirements set forth herein.

2.2 MATERIALS

A. Riprap: Riprap shall be in accordance with the VDOT Specifications, a minimum Grade B stone, and shall be sized as indicated on the DRAWINGS.

B. VDOT Aggregates: VDOT aggregates as noted on the drawings and in the specifications shall be in accordance with aggregate sections of the VDOT Specifications.

PART 3 - EXECUTION

3.1 EQUIPMENT

Weather Limitation: Areas of completed work that are damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

3.2 STOCKPILING MATERIAL

Prior to stockpiling of material, storage sites shall be cleared and leveled by the CONTRACTOR. All materials, including approved material available from excavation and grading, shall be stockpiled in a manner and at locations approved by the ENGINEER. Aggregates shall be stockpiled on the cleared and leveled areas designated by the OWNER so as to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.3 GRADE CONTROL

During construction, the CONTRACTOR shall maintain the lines and grades.

3.4 PLACEMENT

A. Rip-rap material shall be placed in accordance with VDOT Specifications.

3.5 COMPACTION

All aggregates shall be placed and compacted with appropriate equipment. The compacted surface shall be stable and meet the specifications in the Project Manual and/or recommendations for compaction from pipe or aggregate manufacturers wherever applicable. The finished surface shall be free of any deleterious materials and sliding particles.

END OF SECTION

SECTION 02270

EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

The work in this Section includes all the labor, materials, equipment, and incidentals required to provide and maintain erosion and sediment control during construction as indicated on the Drawings and specified herein.

A. The scope of work includes, but is not limited to, the following:

1. Constructing, maintaining, and removing erosion and sediment controls in accordance with the Virginia Erosion and Sediment Control Handbook (VESCH) as necessary during construction.

2. Compliance with the requirements of approved erosion and sediment control plans and construction drawings.

B. Related Work Described Elsewhere:

1. Section 02110 – Clearing, Grubbing, and Stripping

2. Section 02225 – Earthwork

1.2 REFERENCE DOCUMENTS

A. Virginia Department of Conservation and Recreation - VESCH.

B. VDOT Road and Bridge Specifications.

1.3 PROVISIONS

A. CONTRACTOR Compliance:

1. In the event that erosion control measures are required due to the CONTRACTOR'S negligence, carelessness or failure to maintain temporary or permanent control as part of the scheduled Work, the OWNER may order that Work to be performed by the CONTRACTOR at their own expense.

B. Work Suspension: The CONTRACTOR shall comply with the requirements specified herein and as shown on the Plans. Any violation of these requirements may result in the issuance of a written Notice of Suspension of the Work. The suspension of Work will not be lifted until the CONTRACTOR has completely

corrected the violation. Time extensions requested as a result of delays occasioned by such suspensions will not be considered.

PART 2 - PRODUCTS

2.1 EROSION AND SEDIMENT CONTROL

A. Silt Fence: If used for culvert inlet protection or perimeter control, shall meet the requirements of the VESCH.

B. Channel Lining: Shall be as indicated on plans or other equivalent product as approved by the ENGINEER.

C. Erosion Control Mat (ECM):

1. Where permanent ECM is noted (ECM-3 or ECM-3A) on the Drawings, provide East Coast ECP-2 10oz. Polypropylene Turf Reinforcement Mat, or other product on VDOT's approved list of materials AND approved by the ENGINEER.

2. Permanent ECM treatment is specified on the drawings however, temporary ECM may be required to establish a thick stand of grass on some sloped areas not specifically called out in the drawings. Temporary ECM shall meet the requirements of the VESCH for Treatment-1 ECMs (VDOT EC-2 equivalent).

D. Diversion Dikes: Shall meet the requirements of the VESCH.

E. Slope Drains: Shall meet the requirements of the VESCH.

F. Dewatering Structures: Shall meet the requirements of the VESCH.

G. Culvert Inlet Protection: Shall meet the requirements of the VESCH.

2.2 VEGETATION

A. Refer to Section 02900, Landscaping.

PART 3 - EXECUTION

3.1 EROSION AND SEDIMENT CONTROL

A. Install erosion and sediment control measures in accordance with the erosion and sediment control Drawings and applicable VESCH standards.

3.2 PERFORMANCE

A. Inspect erosion and sediment control measures weekly and after each rain event.

B. Repair damaged measures as needed to maintain control.

C. Provide additional measures as required by the OWNER.

3.3 Install erosion control matting in accordance with VESCH Standard 3.36. The erosion control matting manufacturers' standard installation methods may be substituted for the VESCH standard with OWNER's approval.

A. At a minimum, matting ends shall be embedded 6-inches below grade all around.

END OF SECTION

SECTION 02272

GEOTEXTILES

PART 1 - GENERAL

1.1 SUMMARY

The CONTRACTOR shall furnish all labor, material, and equipment necessary to install geotextiles at the locations shown on the Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Unless otherwise specified, geotextiles shall be Propex Geotex 801 or approved non-woven polypropylene or polyester meeting or exceeding the following minimum average roll values (MARV):

PROPERTY	TEST METHOD	VALUE (MARV)
Physical		
Mass/Unit Area	ASTM D 5261	8.0 oz/yd^2
Mechanical		
Grab Tensile Strength	ASTM D 4632	205 lbs
Grab Elongation	ASTM D 4632	50%
CBR Puncture Strength	ASTM D 6241	525 lbs
Trapezoidal Tear	ASTM D 4533	80 lbs
Endurance		
UV Resistance @ 500 hrs	ASTM D 4355	70%
Hydraulic		
Apparent Opening Size (AOS)	ASTM D 4751	80 US Std. Sieve (0.18 mm)
Permittivity	ASTM D 4491	1.50 sec^{-1}
Water Flow Rate	ASTM D 4491	110 gpm/ft^2

B. Geotextile underlying rip-rap shall have a minimum mass per unit area of 10.0 oz/yd^2.

C. For other geotextiles, the geotextile shall have permittivity and water flow rate characteristics equal or exceeding (allowing more water flow) than the geotextile noted in Part 2.1.A above.

D. For woven geotextile (used for mass deficiency areas), provide Geotex 4x4 or approved woven polypropylene equivalents. Equivalents shall have minimum

average roll values for mechanical, Endurance, and hydraulic properties meeting or exceeding the following MARV or Max. ARV values:

PROPERTY	TEST METHOD	VALUE (MARV)
Mechanical		
Grab Tensile Strength	ASTM D 4632	600 x 500 lbs
Grab Elongation	ASTM D 4632	15%
Wide Width Tensile	ASTM D 4595	4800 x 4800 lbs/ft
Wide Width Elongation	ASTM D 4595	10x8%
Wide Width Tensile at 5% strain	ASTM D 4595	660 x 1500 lbs/ft
CBR Puncture Strength	ASTM D 6241	2200 lbs
Trapezoidal Tear	ASTM D 4533	250 lbs
Endurance		
UV Resistance @ 500 hrs	ASTM D 4355	90%
Hydraulic		
Apparent Opening Size (AOS), Max. ARV	ASTM D 4751	30 US Std. Sieve (0.60 mm)
Permittivity	ASTM D 4491	0.15 sec^{-1}
Water Flow Rate	ASTM D 4491	10 gpm/ft^2

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. General

Geotextiles shall be labeled, handled, and stored in accordance with ASTM and as specified herein. Each roll shall be wrapped in an opaque and waterproof layer of plastic during shipment and storage. The plastic wrapping shall not be removed until deployment. Each roll shall be labeled with the manufacturer's name, geotextile type, lot number, roll number, and roll dimensions (length, width, gross weight). Geotextile or plastic wrapping damaged as a result of storage or handling shall be repaired or replaced, as directed. Geotextile shall not be exposed to temperatures in excess of 140 degrees F, or less if recommended by the manufacturer.

B. Handling

No hooks, tongs or other sharp instruments shall be used for handling geotextile. Rolls shall not be lifted by use of cables or chains in contact with the geotextile. Geotextile shall not be dragged along the ground.

3.2 SURFACE PREPARATION

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile. Subgrade materials and compaction requirements shall be in accordance with Section 02225, Earthwork.

3.3 INSTALLATION

A. Geotextile rolls, which are damaged or contain imperfections shall be repaired or replaced as approved. The geotextile shall be laid smooth so as to be free of tensile stresses, folds, and wrinkles. On slopes greater than 5 horizontal to 1 vertical, the geotextile shall be laid with the machine direction of the fabric parallel to the slope direction.

B. Where geotextile is called for on the Drawings between soils and aggregates or rip-rap, the geotextile shall be laid to separate the soil from aggregates or rip-rap on all sides in contact.

1. Geotextiles shall not extend above adjacent soil and shall be trimmed as needed.

C. For woven geotextile used in the mass deficiency area, it is necessary to securely terminate its end and hold in place with compacted fill in an anchor trench prior to placement of succeeding layers.

3.4 PROTECTION

The geotextile shall be protected during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Adequate ballast (e.g. sand bags) shall be used to prevent uplift by wind. Staples or pins shall not be used to hold the geotextile in place. The geotextile shall not be left uncovered for more than 5 days during installation. Equipment with ground pressures less than 5.0 psi shall be used to place the first lift over the geotextile. Overlying materials shall be deployed such that the geotextile is not shifted, damaged, or tensioned. Cover material shall be placed from the bottom of the slope upward. Cover material placed from a bucket shall be dropped from a height no greater than 3 feet.

3.5 SEAMING

A. Overlap Seams

Geotextile panels shall be continuously overlapped a minimum of 12 inches unless otherwise specified. Where it is required that seams be oriented across the slope, the upper sheet shall be lapped over the lower sheet. The CONTRACTOR has the option of field-sewing instead of overlapping.

3.6 REPAIRS

Geotextile damaged during installation shall be repaired by placing a patch of the same type of geotextile, which extends a minimum of 2 feet beyond the edge of the damage or defect. Patches shall be continuously fastened using a sewn seam or other approved method. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Geotextile which cannot be repaired shall be replaced.

END OF SECTION

SECTION 02316

ROCK REMOVAL

PART 1 GENERAL

1.1 SUMMARY

A. This section includes removal of identified and discovered rock during excavation and explosives to assist rock removal. CONTRACTOR must coordinate blasting times with the OWNER to avoid conflict with daily landfill operations. Furthermore, the CONTRACTOR must be cognizant of the proximity of the excavation area to the existing landfill facilities, landfill access roads, and to Interstate I-81.

B. Related Sections:

1. Section 02225 – Earthwork.

1.2 REFERENCES

A. National Fire Protection Association - Code for Manufacture, Transportation, Storage, and Use of Explosive Materials.

1.3 DEFINITIONS

A. Rock: Solid mineral material of size that cannot be removed with conventional excavator equipment.

1.4 SUBMITTALS

A. Shop Drawings: Indicate proposed method of blasting, delay pattern, explosive types, and type of blasting mat or cover, and intended rock removal method.

1.5 QUALITY CONTROL

A. CONTRACTOR shall retain the services of a qualified Geophysical Survey Firm or individual capable of performing a geophysical survey of the site prior to commencing excavation. The firm must specialize in surveys of the type required to identify bedrock depth and have five years experience.

B. Explosives Firm: CONTRACTOR shall retain the services of a qualified explosives or individual with at least five years experience with rock excavation and blasting.

1.6 PROJECT CONDITIONS

A. Obtain a geophysical survey prior to rock excavation to determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties or other work.

1.7 SCHEDULING

A. Conduct blasting operations between hours agreed with OWNER.

PART 2 PRODUCTS

2.1 MATERIALS

A. Explosives: Type recommended by explosive firm following seismic survey and required by authorities having jurisdiction.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions and note subsurface irregularities affecting Work of this section.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. The explosive operation shall meet applicable local, state, and federal regulation requirements.

C. The explosive operation shall not cause damage to the adjacent liner and/or instability of the adjacent waste slopes.

3.3 ROCK REMOVAL

A. Rock Removal by mechanical method.

1. Drill holes and use expansive tools, wedges or mechanical disintegration compound to fracture rock.

B. Rock Removal by explosive methods.

1. Provide seismographic monitoring during progress of blasting operations.

C. Cut away rock at bottom of excavation to form level bearing or disintegrate rock and remove from excavation.

D. Remove shale layers to provide sound and unshattered base for landfill cell.

E. Stockpile excavated materials in a location designated by the OWNER.

F. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 02225, .Earthwork

G. Rock above Base Grade elevations shall be removed to a level two feet below the Base Grade elevation and backfilled as noted on the Drawings.

3.4 FIELD QUALITY CONTROL

A. Request visual inspection of foundation bearing surfaces by ENGINEER before installing subsequent work.

END OF SECTION

SECTION 02443

COMPACTED CLAY LINER

PART 1 - GENERAL

1.1 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, material, and equipment necessary to place and compact material suitable for use as a Compacted Clay Liner (or Layer) to the lines and grades shown on the drawings and as follows:

1. Excavation, segregation, loading, and hauling of suitable low hydraulic conductivity clay liner material from the designated on-site borrow area, or from on-site excavation, shall be incidental to placement.

2. Hauling, handling and installation of suitable low hydraulic conductivity clay liner material from an off-site location if needed.

3. The work also includes construction and field-testing of a Compacted Clay Liner test pad area to verify that methods of construction proposed for placing and compacting the available on-site materials will produce a clay liner with the required maximum hydraulic conductivity of $1x10^{-7}$ cm/sec.

3. CONTRACTOR shall provide Construction Quality Control (CQC) testing as described in these specifications.

B. Related Work Specified Elsewhere:

1. Section 02225 – Earthwork

2. Section 02270 - Erosion and Sediment Control

3. Section 02922 – Textured HDPE Geomembrane

1.2 DEFINITIONS

A. Maximum Dry Density: Maximum dry weight in pounds per cubic foot (pcf) of a specific soil material as determined by ASTM D698 (Standard Proctor).

B. Optimum Moisture Content: The moisture content at which the maximum dry density of a soil material is determined by ASTM D698 (Standard Proctor).

C. Permeability: Also referred to as hydraulic conductivity. Value obtained by testing undisturbed samples in the laboratory under controlled conditions per ASTM D5084, and those obtained from the Two-Stage Borehole test, reported in centimeters per second (cm/sec).

1.3 REFERENCE STANDARDS:

ASTM International Standard Test Methods

1.4 QUALITY ASSURANCE AND CONTROL

A. The CONTRACTOR shall provide quality control (CQC) services as described herein, and which include field and laboratory testing performed by an independent geotechnical testing firm retained by the CONTRACTOR to document and establish conformance with these specifications.

B. The OWNER will provide quality assurance (CQA) services to verify and supplement the results of CQC testing.

C. The CONTRACTOR shall verify the thickness of the Compacted Clay Liner by field surveys certified by a Virginia licensed surveyor. The surveys (before placement of the clay liner and after placement of the clay liner) shall be provided to the OWNER in electronic format showing spot elevations, thickness and contours.

1. Layer thickness will be shown on a 50-ft by 50-ft grid based on spot elevations at each grid point on both the before and after surveys. Show elevations on the respective surveys. On the after (placement of the clay liner) survey, the thickness (i.e., the difference between the before and after survey elevations) will be denoted at each grid point and shown to the second decimal point (e.g., 2.01).

PART 2 - PRODUCTS

2.1 COMPACTED CLAY LINER MATERIAL

A. Compacted Clay Liner material shall not contain debris, waste, frozen materials, vegetation, organic materials, roots, and other deleterious matter. The material shall have a maximum particle size of 2-inches in the lower 18 inches of the layer, and a maximum particle size of ½-inch in the upper six inches. It shall achieve a maximum hydraulic conductivity of 1×10^{-7} cm/sec when placed and compacted to at least 98% relative compaction at 0% to +4% above optimum moisture content as determined by Standard Proctor, or to a relative compaction and moisture content that achieves the hydraulic conductivity and is approved by the ENGINEER.

1. Test Pad:

a. Prior to construction of the Compacted Clay Liner, CONTRACTCOR shall construct a 36-foot by 50-foot test pad using the same equipment and methods as proposed for the actual Compacted Clay Liner and material obtained from the designated on-site (or off-site) borrow areas. Test pad should be constructed at the toe of slope such that one half of the pad is on the cell floor and the other half is on the cell side slope.

b. Soils used in construction of the test pad shall be tested for the following:

1.	Particle Size Analysis	3 tests per pad*
2.	Atterberg Limits	3 tests per pad*
3.	Standard Proctor	3 tests per pad*
4.	Water Content	3 tests per pad*
5.	In Place Density	10 tests per pad*
6.	Hydraulic Conductivity:	
	a. Two Stage Borehole^	3 tests per pad*
	b. Laboratory (tube)	3 tests per pad*

* Test pad to be constructed to the full thickness of the compacted clay liner in a minimum of three lifts. Testing should be distributed throughout the test pad.
^ Two Stage Borehole test per ASTM D6391.

c. In the event that soils are not uniform within a borrow source, an additional test pad shall be constructed for each soil type.

2. Compacted Clay Liner

a. Prior to Compaction: The following tests shall be performed as part of CQC activities to document compliance with requirements after placement (loose lift) and prior to compaction:

1.	Particle Size Analysis	1 per 1000 cy
2.	Atterberg Limits	1 per 1000 cy
3.	Standard Proctor	1 per 5000 cy
4.	Moisture Content	1 per 1000 cy

b. During and After Compaction: The following tests shall be performed as part of CQC activities to document compliance with requirements during and after compaction:

1.	Water Content–nuclear density	5 per acre/lift (min. 3 per lift)
2.	Water Content (ASTM D-3017)	1 per 10 nuclear density tests

3. Density–nuclear density	5 per acre/lift (min. 3 per lift)
4. Density–sand cone (ASTM D-1556)	1 per 20 nuclear density tests*
5. Hydraulic Conductivity - lab	1 per acre per lift

* If results indicate consistent densities after 3 sand cone tests, then discontinue further sand cone testing.

B. CONTRACTOR shall note that the compaction and moisture content requirements may change due to changes in soil and field conditions to achieve the maximum hydraulic conductivity value. The CONTRACTOR shall follow the ENGINEER'S recommendation to make adjustments in compaction and moisture content whenever necessary to achieve the required hydraulic conductivity.

2.2 EQUIPMENT

A. Compaction Equipment

A sheepsfoot roller with a minimum diameter of 60 inches and a tamping foot length of at least 6 inches (distance from the foot to the drum face) shall be required for compaction of the Compacted Clay Liner.

B. Scarification Equipment

Disks, rotor tillers, or other means shall be provided to scarify the surface of each lift of the Compacted Clay Liner prior to placement of the next lift. The scarification equipment shall be capable of uniformly disturbing the upper 1-inch of the Compacted Clay Liner surface to provide good bonding between lifts.

C. Steel Wheeled Rollers

A smooth steel-wheeled roller shall be used to seal the top surface of the soil liner. Steel-wheeled rollers shall weigh a minimum of 20,000 pounds.

PART 3 - EXECUTION

3.1 BORROW SOURCE

A. On-Site Borrow Source: Soils from portions of the cell excavation and other on-site areas where shown have been tested and estimated to be suitable for use as a Compacted Clay Liner material. Available information will be provided upon request. However, the CONTRACTOR may be required to screen, crush, process, and moisturize the soils in order to meet the specifications herein.

CONTRACTOR shall perform additional exploration and testing of the on-site borrow materials if the soil types change, testing of the test pad does not meet requirements, or testing of the in-place lifts does not meet requirements.

B. Off-Site Borrow Sources: CONTRACTOR may propose to obtain Compacted Clay Liner material from an off-site borrow source at no additional cost to the OWNER, with the approval of the ENGINEER and OWNER. Off-site borrow material is subject to the same material and testing requirements as on-site material.

3.2 SUBGRADE PREPARATION

A. Compacted Clay Liner shall not be placed on surfaces that are muddy, frozen, or contain frost. Fill material placed under the Compacted Clay Liner will be in accordance with the Section 02225, Earthwork of these specifications. Unsatisfactory material shall be removed from the upper 12 inches of surfaces to receive Compacted Clay Liner and shall be replaced with satisfactory Controlled Fill material.

3.3 INSTALLATION

A. Compacted Clay Liner Placement

Compacted Clay Liner shall be placed to the lines and grades shown on the drawings and as follows:

1. The liner shall be placed in a minimum of 3 uniform lifts to achieve a total compacted thickness as shown on the PLANS, measured perpendicular to the slope.

2. Soil clods larger than 3 inches in diameter shall be broken up and the surface shall be scarified between lifts.

3. Grade stakes shall not be driven into the Compacted Clay Liner.

4. CONTRACTOR shall maintain and prevent erosion of the Compacted Clay Liner at all times during construction.

5. Repair of damages to the Compacted Clay Liner due to inadequate maintenance, and/or erosion shall be at the CONTRACTOR’s own expense.

B. Moisture Control

1. The moisture content shall be maintained uniform throughout each lift.

2. Moisture added shall be thoroughly incorporated into the soil to ensure uniformity of moisture content prior to compaction.

3. CONTRACTOR shall protect Compacted Clay Liner from moisture content changes following placement and compaction. This may include protection with a temporary plastic cover until the permanent 60 mil textured HDPE geomembrane is installed, or other means approved by the ENGINEER.

C. Compaction

Compaction and moisture content shall be closely controlled and monitored through CQC testing to ensure that density, moisture content, maximum particle size, lift bonding, and clod destruction are within the acceptable range.

D. Scarification

Scarification shall be performed on all areas of the upper surface of each soil lift prior to placement of the next lift to produce bonding between lifts. Scarification shall be accomplished with approved equipment. The final lift of Compacted Clay Liner shall not be scarified. It shall be rolled with an approved smooth steel-wheeled roller to provide a smooth surface with no ridges, depressions or other irregularities.

E. Repair of Voids

Voids in the Compacted Clay Liner created during construction, including penetrations for test samples and other penetrations necessary for construction shall be repaired immediately by removing sand or other non-soil material, placing Compacted Clay Layer material or bentonite in lifts no thicker than 3 inches and tamping each lift with a steel rod or tamp. Other ruts and depressions in the surface of the lifts shall be scarified, filled, and then compacted to grade.

3.4 PROTECTION

A. Weather Conditions

Compacted clay liner placement and compaction shall not take place during adverse weather conditions of freezing, desiccation, or excessive moisture. Placement will not be permitted immediately after heavy rainfall, or when overnight temperatures fall below 32-degrees F. Extremely hot and dry conditions will necessitate continuous watering and blending, and placement of a temporary cover during periods of interrupted construction.

B. Excess Surface Water

Excess moisture shall be removed prior to placement of additional Compacted Clay Liner. If in-place Compacted Clay Liner is reworked and recompacted, affected areas shall be retested at the same frequency as the rest of the project. Occurrences of excess surface water shall be documented including location and

volume of Compacted Clay Liner affected, corrective action taken, replacement, and retesting.

3.5 ACCEPTANCE

Portions of the in-place Compacted Clay Liner which display significant desiccation or freeze-thaw cracking, or erosion, will be rejected. Succeeding lifts shall not be placed over areas that have been rejected.

The OWNER reserves the right to reject any or all Compacted Clay Liner, no matter the stage of construction, which does not meet the compaction, moisture content, material or permeability requirements. Portions of the Compacted Clay Liner damaged by weather conditions will be rejected regardless of prior acceptance.

END OF SECTION

SECTION 02444

LEACHATE COLLECTION AGGREGATES

PART 1 - GENERAL

1.1 SUMMARY

The CONTRACTOR shall furnish all labor, material, equipment, and tools necessary to construct the leachate collection system as shown on the drawings.

1.2 QUALITY CONTROL

CONTRACTOR is responsible for providing quality control of leachate collection system construction.

1.3 SUBMITTALS

A. Prequalification:

Submit the material source, preconstruction material test results for parameters listed in Table 02444-1, descriptions, and material specifications certified by the supplier to the ENGINEER for approval.

B. Approval of Material Source:

The source of the material to be used for producing aggregates shall be selected not less than thirty (30) days prior to the time the material will be required in the work. Any changes in the source of materials shall be reported to the ENGINEER immediately. The ENGINEER shall approve the new source. The CONTRACTOR shall be fully responsible for any delays in construction due to changes in material sources.

C. Certificate of Compliance: The CONTRACTOR shall submit to the ENGINEER for approval before procurement a Certificate of Compliance from the manufacturer that the supplied materials meet the specifications herein.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Protective Layer

1. The material shall be free from foreign materials including vegetative matter, topsoil, and other deleterious material and shall contain no frozen material. Slag shall not be used.

2. The material shall have no more than 1.5-percent passing the No. 200 sieve, no more than 50-percent of the material passing the 0.5-inch sieve (i.e., D_{50} of 0.5-inches), and a maximum stone size of 1.5-inches.

3. It shall have a loss of density not greater than 10 percent of the weighted average at five cycles when tested for soundness (per ASTM C88), and a percent of wear not exceeding 40 percent after 500 revolutions (per ASTM C131/C535), or as determined by the requirements of VDOT Road and Bridge Specifications.

4. Material shall contain no greater than 15% calcium carbonate equivalent in accordance with JLT Lab Method 5-105-89 or approved equivalent test method.

5. The material shall have a hydraulic conductivity equal to or greater than (more permeable) than $1x10^{-3}$ cm/s.

B. Stone Surrounding Leachate Collection Pipes (VDOT #57)

1. The material shall be free from foreign materials including vegetative matter, topsoil, and other deleterious material and shall contain no frozen material. Slag shall not be used. The aggregates shall have no more than 1.5% passing the No. 200 sieve. It shall have a loss of density not greater than 10 percent of the weighted average at five cycles when tested for soundness (per ASTM C88), and a percent of wear not exceeding 40 percent after 500 revolutions (per ASTM C131/C535), or as determined by the requirements of VDOT Road and Bridge Specifications.

2. Material shall contain no greater than 15% calcium carbonate equivalent in accordance with JLT Lab Method 5-105-89 or approved equivalent test method.

2.2 EQUIPMENT

Equipment used to place the drainage layer shall have a low ground pressure (5 psi ground pressure or less) and shall be approved by the ENGINEER. Equipment used for hauling material for placement or other equipment used in the Protective Layer shall meet the ground pressure requirements not in Part 3.2.A.2, below.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

Aggregates shall be placed directly over the geocomposite drainage layer (GDN). Placement of the aggregates shall not proceed until the ENGINEER has approved the GDN, geomembrane, and Compacted Clay Liner.

3.2 INSTALLATION

A. Aggregates shall be placed and spread to the limits and thickness shown on the drawings. During spreading operations, the CONTRACTOR shall provide a spotter to prevent damage to the underlying geosynthetics (GDN and geomembrane). Place from the bottom of the slope, then move upward along slope.

1. Compaction and grading shall be in accordance with Section 02225, Earthwork. Granular materials shall adhere to compaction requirements of bedding and haunching aggregates. Soils shall adhere to compaction requirements of general fill.

2. Refer to Section 02922, Textured HDPE Geomembrane for ground pressure and minimum thickness requirements during placement.

3. Leachate collection pipes shall be installed as shown on the drawings and as specified. Leachate collection pipe shall be backfilled as shown on the drawings and as specified herein.

3.3 PROTECTION

A. Weather Conditions: Placement of aggregate shall not take place during adverse weather conditions of freezing, desiccation, or excessive moisture.

B. Traffic: During construction, the CONTRACTOR shall maintain sufficient thickness of materials over the leachate collection pipe at equipment crossing locations adequate to protect the pipe from damage.

3.4 SURVEYING

A. The CONTRACTOR shall verify the thickness of the Protective Layer by field surveys certified by a Virginia licensed surveyor. The surveys (before placement of the layer and after placement of the layer) shall be provided to the OWNER in electronic format showing spot elevations, thickness and contours.

1. Layer thickness will be shown on a 50-ft by 50-ft grid based on spot elevations at each grid point on both the before and after surveys. Show elevations on the respective surveys. On the after (placement of the clay liner) survey, the thickness (i.e., the difference between the before and after survey elevations) will be denoted at each grid point and shown to the second decimal point (e.g., 1.01).

3.5 TESTING

A. Provide testing per Table 1-2444 and Table 2-02444. Alternate test methods may be used with prior approval from the ENGINEER.

Table 1-02444 Preconstruction Material Testing		
Test	Method	Minimum Frequency
Sulfate Soundness	ASTM C88	1 per source; 2 per source for calcium carbonate
Percent Finer than No. 200 Sieve	ASTM C117 or AASHTO Test Method T11	
LA Abrasion	ASTM C131/C535	
Sieve Analysis	ASTM C136	
Calcium Carbonate	JLT Lab Method 5-105-89	
Hydraulic Conductivity	ASTM D2434	1 per source for Protective Layer only

Table 2-02444 CQC Testing		
Test	Method	Minimum Frequency
Percent Finer Than No. 200 Sieve	ASTM C117 or AASHTO Test Method T11	1 per 2 acres for Protective Layer; 1 per 500 LF for leachate pipe trench
Sieve Analysis	ASTM C136	1 per 2 acres for Protective Layer; 1 per 500 LF for leachate pipe trench

END OF SECTION

SECTION 02900

LANDSCAPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work specified in this Section consists of furnishing all necessary labor, equipment, material, and transportation necessary to furnish and place topsoil, prepare areas for planting, establish a stand of vegetative cover, and mow grassed areas. Also included are the following:

1. Fertilizing, watering, and maintenance as required to produce a healthy stand of grass.

2. Furnishing and mixing soil amendments.

3. General maintenance.

1.2 SPECIAL PROJECT WARRANTY

A. Warranty grassed areas (that were seeded by CONTRACTOR) for a one (1) year period from the date of substantial completion of seeding. Substantial completion of seeding shall be approved by OWNER, and may be a date different than Substantial Completion for the project. Date of substantial completion of seeding shall be agreed upon in writing by OWNER and CONTRACTOR.

A final warranty inspection will be conducted at the end of the warranty period to determine acceptance or rejection. Reseed areas not meeting the requirements for a good stand of grass.

1. A good stand of grass is defined as an area having grass covering more than 80% of the area. Percentage coverage is based on visual inspection by the ENGINEER.

1.3 SUBMITTALS

A. Soil testing

1. Provide test results for the criteria listed in Part 2.1.B.2 below. Results shall be provided for on-site and off-site topsoil materials.

2. For off-site topsoil, topsoil manufacturer/distributor to provide toxicity leaching (TCLP) testing and petroleum product testing data for approval. No topsoil shall be transported to the site until testing data has been approved by the ENGINEER.

    a. Materials failing the TCLP shall not be used as topsoil.

    b. Materials with TPH greater than 1 mg/kg shall not be used as topsoil.

B. Certificates from seed vendors for each seed mixture are required and shall include botanical and common name, percentage by weight and percentage purity.

C. Written warranty statement for the special project warranty noted in Part 1.2 above.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 – PRODUCTS

2.1 TOPSOIL

A. Reuse topsoil stripped from construction areas. CONTRACTOR shall screen topsoil and amend topsoil as needed to meet the requirements of Part 2.1.B below.

B. On-site topsoil may need to be supplemented with off-site materials. The amended topsoil shall meet the following requirements:

1. Topsoil shall be a fertile, natural or amended soil, friable material possessing the characteristics of representative soils in the vicinity that sustain growth of crops, grass or other vegetation. The topsoil shall be free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and shall be free from stones, stumps, and other objects larger than two inches in diameter. Topsoil shall be free from toxic substances and from any other material or substance that might be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations. Soils containing refuse, slag, cinders, or construction debris shall not be acceptable.

2. Topsoil, prior to placement, shall have the following characteristics:

Property	Qualifier	Specified Value
Organic matter	Minimum	1.5% by weight
pH	range	6.0-7.5
Soluble salts	less than	500 ppm

C. Off-site topsoil properties shall be in accordance with 2.1.B.1 and 2 above.

2.2 SOIL AMENDMENTS

A. Lime: Natural dolomitic limestone containing not less than 85 percent of total carbonates with a minimum of 30 percent magnesium carbonates, ground so that not less than 90 percent passes a 10-mesh sieve and not less than 50 percent passes a 100-mesh sieve.

B. Peat Humus: Finely divided peat, so completely decomposed and free of fibers that its biological identity is lost. Provide in granular form, free of hard lumps and with pH range suitable for intended use.

C. Manure:

Well rotted, unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials and containing no chemicals or ingredients harmful to plants.

D. Commercial Fertilizer

Provide complete fertilizer of neutral character, with some elements derived from organic sources and containing following percentages of available plant nutrients:

1. For grass areas, provide fertilizer with percentage of nitrogen not less than 10 percent and not less than 6 percent phosphoric acid and 4 percent potassium. Provide nitrogen in a form that will be available to lawn during initial period of growth; at least 25 percent of nitrogen to be organic form.

2.3 VEGETATIVE COVER

A. Grasses and Vegetative Seed Mixtures:

1. Provide fresh, clean, new-crop seed complying with established state standards (Virginia Erosion & Sediment Control Handbook, 1992) and bear an official “Certified Seed” label by the Virginia Crop Improvement Association. Provide seed mixture composed of species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified.

2. Weed seed shall not exceed 1.0 percent by weight of the total mixtures. Seed shall not contain any prohibited or restricted noxious weeds. Wet, moldy, or otherwise damaged seed shall be rejected.

3. Labels shall be in conformance with AMS-O1 and applicable seed lawns for the Virginia.

4. Inoculant: The inoculant added to legume seed in the permanent seed mixture shall be a pure culture of nitrogen-fixing bacteria prepared for the species of White Clover and Ladino Clover. Inoculants shall not be used later than the date indicated on the container. Use only fresh, unopened packages of legume inoculates. Legume inoculant shall be stored in a cool place until its use. Pre-inoculated seed shall not be acceptable.

5. Temporary Seed Mixture for erosion control shall be in accordance with the Virginia Erosion and Sediment Control Handbook, 3rd ed., 1992, (VESCH) Standard 3.31, Temporary Seeding.

6. Permanent Seed Mixture shall be in accordance with VESCH Standard 3.32, Permanent Seeding. Provide seed mixture for the Appalachian area as follows:

Ingredients	% of Mixture	Minimum Percent Pure Live Seed
Kentucky 31 Fescue	85%	90-95%
Red Top Grass	2%	90-95%
Seasonal nurse crop*	13%	90-95%

*Seasonal nurse crop is dependent on seeding dates as follows:

Annual Rye for March - May 15th, August 16th - October
Winter Rye for November through February
Foxtail Mullet for May 16th – August 15th

PART 3 – EXECUTION

3.1 PREPARATION – GENERAL

A. Layout boundaries (no staking within cell limits) for each of the bare/denuded areas prior to seeding operations, and secure ENGINEER acceptance before start of seeding work. Make minor adjustments as required and approved by ENGINEER.

3.2 PREPARATION FOR PLANTING AND PERMANENT VEGETATIVE COVER

A. Lightly scarify areas which are to receive topsoil.

B. Spread topsoil evenly and to minimum depth of 6 inches, after light rolling and

natural settlement. Surface to be uniform and free of water retaining depressions.

C. Application of Soil Amendments

1. Lime as specified shall be spread uniformly over designated areas. Rate of application shall be as recommended by results of soil tests.

2. Apply specified commercial fertilizer over designated areas. Rate of application shall be as recommended per soil tests. Fertilizer shall be spread with approved equipment and at an even rate over the area to be seeded. Delay application of fertilizer if lawn planting will not follow within a few days.

3. Thoroughly mix lime and fertilizer into topsoil stockpile. Mixing on the landfill of in-place topsoil is not permitted due to possible damage to the flexible membrane liner. However, mixing outside of the landfill limits (cell limits) is allowed.

E. Fine grade areas to smooth, even surface with loose, uniformly fine texture. Limit fine grading to areas which can be planted immediately after grading.

F. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting grass. Do not create a muddy soil condition.

G. Restore areas to specified condition, if eroded or otherwise disturbed, after fine grading and prior to planting.

3.3 SEEDING OF BARE/DENUDED AREAS

A. The regular seeding season is March 1 to May 15 and August 1 to November 15. No seeding shall be done on frozen ground or when the temperature is 32 degrees or lower.

B. One of the following two methods or any combination may be used for seeding after final soil preparation has been completed.

1. Dry Application

a. Apply seed mixture(s) with broadcast spreader at 150 lbs per acre. Apply in 2 different directions for best coverage.

b. Compact seed bed with culti-packer or similar equipment.

c. Apply straw mulching material to retain moisture and minimize erosion. Application rate shall be 80 lbs per 1,000 square feet.

d. Stabilize mulch by either a disc with straight coulters or liquid mulch binders (non-asphaltic). Apply binder at rate recommended by manufacturer.

2. Hydroseeding Application

a. Equipment Calibration: The equipment to be used and the methods of seeding shall be subject to the inspection and approval of the OWNER or ENGINEER prior to commencement of seeding operations. Immediately prior to the commencement of seeding operations, the contractor shall conduct seeding equipment calibration tests in the presence of the OWNER or ENGINEER.

b. Applying Seed: Seed shall be placed by hydraulic methods. Alternative seeding methodologies must be approved the OWNER or ENGINEER prior to the seeding operation. Water, seed and fertilizer shall be sprayed on previously prepared seed bed in the form of an aqueous mixture with a Seed type and rate the same as in Dry Application above. Care shall be exercised to insure a uniform coverage and to guard against misses and overlaps. All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seed bed. CAUTION: If fertilizer is mixed into slurry, no more than 30 minutes should lapse before it is applied, to prevent fertilizer from burning the seed. (Rate of cellulose fiber mulch application is 1500 1bs/acre).

c. Hydraulic Seeding: Hydraulic seeding shall consist of hydroseeding using approved hydroseeding equipment. Seed shall be added to water in the hydroseeder and thoroughly mixed at the manufacturer's specified rate when inoculant is included in the hydroseeder slurry. Slurry shall be kept continuously agitated and shall be uniformly applied under pressure over the entire area. Any area inadequately covered shall be retreated.

d. Hydroseeding Equipment: A hydroseeder with paddle agitators shall be used. If approved by the OWNER or ENGINEER, other hydroseeding equipment capable of maintaining a homogenous slurry may be used. Recirculating type agitation is not acceptable as it may reduce seed viability. The hydroseeder must have a minimum of two different nozzles for application of the seed mix; one nozzle for side application and one for long distance spraying. The hydroseeder shall be mounted on a rubber-tired vehicle and shall be operated by a qualified operator.

e. Straw Mulch: Straw mulch shall be spread uniformly at the rate of two tons per acre. Mulch shall be spread by blower-type mulch spreader or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of a steep slope and continued uniformly until the area is covered. The mulch shall not be bunched. All seeded areas shall be mulched on the same day as the seeding.

f. Anchoring: Immediately after mulching, the seeded and mulched area shall be anchored with one pass of a disc with straight coulters pulled by a low ground pressure track mounted dozer or equivalent, unless a binder is selected by the CONTRACTOR.

3.4 MAINTENANCE

A. General: Begin maintenance immediately after planting.

B. Watering shall be started within seven days after completing seeding and mulching. Water shall be applied at a rate sufficient to ensure moist soil conditions to a minimum depth of 1-inch. Run-off and puddling shall be prevented. Do not allow rills and furrows to form as a result of watering.

1. Water areas once every other day for the first month after seeding.

2. After first month, water areas as needed to maintain stand of grass.

C. Maintenance of the grassed areas shall include eradicating weeds, eradicating insects and diseases, protecting areas from erosion, maintaining erosion control materials and mulch, protecting areas from traffic, mowing, watering, and post-fertilization. Maintain seeded areas in healthy, vigorous condition at CONTRACTOR's own expense until all contracted work is completed and accepted by the ENGINEER.

D. Post-Fertilization: Ninety days after planting, nitrogen carrier fertilizer shall be applied at a rate such that 0.5 pounds of available nitrogen is applied per 1000 square feet. A similar rate of application shall be made prior to the final inspection at the end of the warranty period.

E. The CONTRACTOR shall reseed all areas in which seed has died or been damaged prior to the end of the warranty period. To be accepted, the entire grassed area shall present a good stand of grass and there shall be no bare areas greater than 1 square foot in size.

3.5 CLEANUP

Cleanup: Promptly remove soil and debris created by seeding work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking solids onto surface of roads, walks, or other paved areas.

3.6 INSPECTION AND ACCEPTANCE

A. Preliminary Inspection: Prior to the date of Substantial Completion of seeding, a preliminary inspection shall be held by the ENGINEER. Time for the inspection shall be established by the CONTRACTOR. The acceptability of the areas shall be determined in accordance with this Specification. An unacceptable stand of lawn shall be repaired as soon as conditions permit.

B. Warranty Inspection: An inspection shall be held by the ENGINEER approximately one year from the date of substantial completion of seeding. Acceptance of the seeding and planting operation is subject to the warranty requirement of having a good stand of grass.

C. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until reinspected by the ENGINEER and found to be acceptable.

3.7 MOWING

C. Mow grass once in areas under warranty to a maximum height of 3 inches, but no less than 2 inches.

D. In areas seeded as part of the project, do not mow prior to 90 days after seed was placed.

END OF SECTION

SECTION 02922

TEXTURED HDPE GEOMEMBRANE

PART 1 - GENERAL

1.1 SCOPE

Work in this Section includes the manufacture, fabrication, testing, supply and installation of textured high density polyethylene (HDPE) geomembrane for the liner system.

1.2 QUALITY CONTROL AND QUALITY ASSURANCE

A. All tests and test frequencies specified in this section are Quality Control (QC) tests, and these tests are the responsibility of the CONTRACTOR.

B. The ENGINEER or OWNER'S third party Quality Assurance (QA) Consultant will monitor geomembrane installation and construction.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced.

A. ASTM International Standard Test Methods/Practices

ASTM D 792	Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 1004	Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1238	Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D 1248	Polyethylene Plastics Molding and Extrusion Materials
ASTM D 1505	Density of Plastics by the Density-Gradient Technique
ASTM D 1603	Carbon Black in Olefin Plastics,
ASTM D 3895	Test Method for Oxidative Inductive Time of Polyolefins by Differential Scanning Calorimetry
ASTM D 4218	Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D 4833	Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 5199	Measuring Nominal Thickness of Geotextiles and Geomembranes
ASTM D 5321	Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method
ASTM D 5397	Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

ASTM D 5596	Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
ASTM D 5721	Air-Oven Aging of Polyolefin Geomembranes
ASTMD 5885	Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry
ASTM D 5994	Measuring the Core Thickness of Textured Geomembranes
ASTM D 6392	Determining the Integrity of Non-reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
ASTM D 6693	Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced polyethylene and Nonreinforced Flexible Polyethylene Geomembranes.
ASTM D 7466	Standard Test Method for Measuring Asperity Height of Textured Geomembranes

B. Geosynthetics Research Institute (GRI) Standard Practices

GRI GM-5(a)	Single Point Notched Constant Tensile Load (SP-NCTL) Test for Polyolefin Resin or Geomembrane
GRI GM-6	Pressurized Air Channel Test for Dual Seamed Geomembranes
GRI GM-9	Cold Weather Seaming of Geomembranes
GRI GM-11	Accelerated Weathering Geomembranes Using a Fluorescent UVA-Condensation Exposure Device
GRI GM-12	Measurement of the Asperity Height of Textured Geomembranes Using a Depth Gage
GRI GM-13	Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembrane.

C. Construction Quality Assurance Plan

1.4 SUBMITTALS

A. Manufacturer’s corporate background information, manufacturing capabilities and proof of qualifications as follows:

1. The Manufacturer must have at least five (5) years documented experience in the manufacture of HDPE geomembrane rolls, and/or documented experience totaling 1,000,000 m^2 (10,000,000 ft^2) of manufactured HDPE geomembrane rolls for at least ten (10) completed facilities, or as approved by the ENGINEER.

2. Submit a complete description of the geomembrane manufacturer's formal quality control programs for manufacturing, fabricating, handling, installing, and testing. The document shall include a complete description of seaming by extrusion welding and hot wedge welding.

3. Submit complete manufacturer's specifications, descriptive drawings, and literature for the HDPE geomembrane, including the product identification and supplier of the polymer resin and recommended method for handling and storage of all materials prior to installation.

B. Installer’s qualifications as follows:

1. Show a minimum of five years continuous experience for which the INSTALLER has installed HDPE geomembrane.
2.
3. The INSTALLER shall be approved and/or licensed by the geomembrane manufacturer.

4. List of proposed seaming personnel and their experience records. Personnel must be approved before they perform seaming. All personnel performing seaming operations shall be qualified by experience and by successfully passing trial seam tests prior to installing the Work.

5. Installation shall be performed under the direction of an installation superintendent. The superintendent shall have previously installed or supervised the installation of a minimum of 1,000,000 m^2 (10,000,000 ft^2) of HDPE geomembrane.

6. Actual seaming shall be performed under the direction of a "master seamer" who may be the same person as the field superintendent and who has seamed a minimum of 200,000 m^2 (2,000,000 ft^2) of HDPE geomembrane using the type of seaming apparatus as that proposed for use for this project. The mast seamer shall provide direct supervision over less experienced seamers and shall be on site during seaming operations.

C. HDPE Geomembrane Prequalification. Submit independent quality control laboratory test results demonstrating compliance with material properties listed in Table 1, HDPE Resin Properties (Without Carbon Black), and Table 2, Textured HDPE Geomembrane Properties.

D. Origin (Resin Supplier's name, resin production plant) and identification (brand name, number) of the HDPE resin.

E. Panel Layout Drawing: At a minimum, drawings shall include an approximate panel deployment sequence, panel orientation, type of weld to be used for each seam, incorporate restrictions on panel and seam orientation, methods of deployment, and details of each step in the construction of any penetrations.

1.4.1 Manufacturer Quality Control Certificates

The CONTRACTOR shall submit test reports to the QA Representative within 48 hours of completion of the test. Manufacturer quality control certificates are required prior to HDPE geomembrane shipment. The following information must be submitted for approval prior to shipping the material:

1.4.1.1 HDPE Resin

Copy of quality control certificates issued by the HDPE Resin Supplier including production date(s) of the HDPE resin and statement that no reclaimed polymer was added to the resin. However, the use of polymer recycled during the manufacturing process may be permitted if done with appropriate cleanliness and if recycled polymer is the same HDPE as the parent material and does not exceed ten (10) percent by weight.

1.4.1.2 HDPE Geomembrane

Quality control certificates for each roll of geomembrane. The quality control certificates shall include: Roll numbers and identification; certification by the manufacturer that the geomembrane meets specified properties; list of quantities and descriptions of materials other than the base polymer which comprise the geomembrane.

1.4.2 Submittals Required for Project Closeout

A. Record Drawings. Submit HDPE geomembrane record drawings to the ENGINEER as specified in Section 01700, Contract Closeout.

B. Warranties (see Part 1.6)

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Handling

The CONTRACTOR'S personnel shall handle the material with care, shall use adequate equipment and shall take all precautions necessary to prevent damaging the HDPE geomembrane.

1.5.2 Inspection upon Delivery

Upon delivery at the site, the CONTRACTOR, in the presence of a QA representative, shall conduct a visual inspection of rolls or factory panels for defects and for damage.

1.5.3 Storage

The CONTRACTOR shall be responsible for ensuring that the stored materials are protected from damage.

1.6 WARRANTY

The HDPE Geomembrane Manufacturer shall provide a prorated 5-year material warranty. The CONTRACTOR shall warrant the HDPE geomembrane to be free of workmanship defects for a period of 1-year following the date of final completion of the work under this contract. The warranty required herein shall be provided in addition to any warranty required by the contract general conditions.

PART 2 - PRODUCTS

2.1 HDPE GEOMEMBRANES

2.1.1 Single Source

All HDPE geomembrane sheets and HDPE extrudate for the construction of the project must be obtained from a single material supplier and manufacturer. It must be certified and warranted that the sheets, extrudate, and pipe boots are compatible with one another. The CONTRACTOR shall provide manufacturer's warranties for the sheets, HDPE extrudate material, and pipe boots.

2.2 MATERIAL PROPERTIES

2.2.1 HDPE Geomembrane

HDPE resin shall meet or exceed the requirements of Table 1, HDPE Resin Properties (without Carbon Black). HDPE geomembrane shall meet or exceed the requirements of Table 2, Textured HDPE Geomembrane Properties. Equivalent test methods are subject to the approval of the ENGINEER.

2.2.2 Extrudate

Extrudate shall be the same resin as the HDPE geomembrane. The manufacturer shall provide documentation and shall certify that the extrudate meets this requirement.

2.2.3 Material Composition

The HDPE geomembrane shall consist of new, first-quality products designed and manufactured specifically for the purpose of this project, as satisfactorily demonstrated by prior use. The HDPE geomembrane shall be unmodified HDPE containing no plasticizer, fillers, chemical additives, reclaimed polymers, or extenders.

2.2.4 Textured Surface

Textured-surface geomembrane shall be manufactured so that the surface irregularities that produce the specified friction are on both sides of the sheet. The HDPE geomembrane thickness required shall not include the high points of the textured surface.

2.3 MANUFACTURER QUALITY CONTROL TESTS

2.3.1 Test Reports

Specified tests shall be performed by the Manufacturer.

2.3.2 Manufacturer Quality Control Tests

A. HDPE resin shall be tested at a frequency of one test per resin batch. One batch is defined as one rail car load of resin. As a minimum perform tests for Density and Melt Index. Compliance with the Polymer Composition test requirement shall be established with a manufacturer's certificate of compliance. The finished rolls shall be identified by a roll number corresponding to the resin batch used.

B. HDPE geomembrane shall be tested for properties required by Table 2. The following minimum test frequencies shall be observed:

Property	**Test Method ***	**Minimum Frequency**
Thickness	ASTM D 5994	each roll
Asperity Height	GRI GM 12	every 2nd roll
Density	ASTM D 792 or ASTM D 1505	200,000 lb
Tensile Properties	ASTM D 6693 Type IV	20,000 lb
Tear Resistance	ASTM D 1004	45,000 lb
Stress Crack Resistance	ASTM D 5397	per GRI GM10
Oxidation Induction Time	ASTM D 3895/5885	200,000 lb
Puncture Resistance	ASTM D 4833	45,000 lb
Carbon Black Content	ASTM D 1603	20,000 lb
Carbon Black Dispersion	ASTM D 5596	45,000 lb
Oven Aging	ASTM D 5721 and ASTM D5885/3895	per formulation
UV Resistance	GRI GM11 and ASTM 5885	per formulation

* ENGINEER to approve test procedures, or modified procedures, as test methods are changed or updated frequently.

PART 3 - INSTALLATION

3.1 INSTALLATION EQUIPMENT

3.1.1 Seaming Methods

Approved processes for field seaming are extrusion welding and fusion welding. Solvent or adhesive welding is prohibited. Proposed alternate processes shall be documented and submitted to the ENGINEER for approval. Only apparatuses which have been specifically approved by make and model shall be used.

3.1.2 Welding Equipment

The CONTRACTOR shall provide welding equipment with gauges showing temperatures at the nozzle or barrel (extrusion welder) and at the wedge (fusion welder). The fusion-welding apparatus must be automated self-propelled devices, and shall be equipped with gauges giving the important temperatures and pressures.

3.1.3 Field Tensiometer

The CONTRACTOR shall provide a field tensiometer for on site peel and shear testing of HDPE geomembrane seams for Quality Control capable of performing testing equivalent to ASTM D 6392.

3.1.4 Punch Press

The CONTRACTOR shall provide a punch press for the on site preparation of specimens for testing.

3.2 PREPARATION

3.2.1 Surface Preparation

Prior to HDPE geomembrane panel deployment, the CONTRACTOR shall inspect the surface upon which the geomembrane will be placed. The surface shall be prepared in accordance with Sections 02225, Earthwork and 02443, Compacted Clay Liner.

3.2.2 Certification of Subgrade Acceptance

The CONTRACTOR shall be responsible for preparing the subgrade soil according to the Contract Documents. Prior to geomembrane installation, the INSTALLER shall certify in writing that the surface upon which the geomembrane will be installed is acceptable. A copy of the Certificate of Acceptance is provided in subsection 3.13. The Certificate of Acceptance shall be given by the CONTRACTOR/INSTALLER to the QA Representative prior to commencement of geomembrane installation in the area under consideration.

3.2.3 Damaged Soil Areas

Prior to geomembrane panel deployment, the CONTRACTOR shall repair damaged areas.

3.2.4 Anchor Trench

HDPE geomembrane anchor trenches shall be constructed to the lines and grades shown on the Drawings. The geomembrane in the anchor trench shall be constructed as shown on the Drawings and backfilled as indicated with care not to damage the geomembrane.

3.3 PANEL DEPLOYMENT

3.3.1 Identification

Each field panel shall be given a unique "identification code" consistent with the layout plan.

3.3.2 Installation Sequence

The INSTALLER shall be responsible for the final installation sequence of geomembrane panels.

3.3.3 Orientation

Panels shall be oriented perpendicular to the line of the slope crest. Seams parallel to or less than a 45 degree angle from any crest or toe of slope are defined as horizontal seams. Horizontal seams are prohibited on slopes greater than 10 (horizontal): 1 (vertical) and shall be at least 5 feet from the crest or toe of slopes greater than 10:1.

3.3.4 Wrinkles

HDPE geomembrane panels shall be unrolled using methods that will minimize wrinkles and will not damage, stretch, or crimp the geomembrane and shall protect the underlying subsurface from damage. Folded wrinkles that cannot be controlled or eliminated by other means shall be removed by cutting and patching.

3.3.5 Bridging

Material shall be installed to allow for temperature related shrinkage and to avoid bridging of the geomembrane.

3.3.6 Seam Layout

Panels shall be placed such that the seam layout conforms as closely as practicable to the approved panel layout drawing. No panels may be seamed in the field without the QA Representative's approval. In addition, panels not specifically shown on the seam layout drawing may not be used without the QA Representative's prior approval. Seams shall be identified using the identification codes shown on the panel and seam layout drawing.

3.4 FIELD SEAMS

3.4.1 Seam Strength

All field seams shall meet or exceed the requirements of Table 3 for HDPE Geomembrane Seam Properties.

3.4.2 Overlapping

Panels of geomembrane must have a finished overlap of a minimum of three (3) inches for extrusion welding and four (4) inches for fusion welding, but in any event, sufficient overlap shall be provided to allow peel tests to be performed on the seam.

Field seams shall have a minimum width of one (1) inch.

3.4.3 Weather Conditions for Seaming

A. Unless authorized in writing by the ENGINEER or QA Representative, no seaming shall be attempted at ambient temperatures below 32°F (0°C) or above 104°F (40°C). If seaming is authorized at temperatures below 32°F (0°C), pre-heating devices shall be placed on all welding machines, and seaming shall be performed in accordance with Geosynthetic Research Institute (GRI) Test Method GM9 Standard Practice “Cold Weather Seaming of Geomembranes.”

B. Between ambient temperatures of 32°F (0°C) and 50°F (10°C), seaming may be carried out if the geomembrane is preheated by either the sun or a hot air device, and if there is not excessive cooling resulting from the wind. Above an ambient temperature of 50°F (10°C), no preheating is required.

C. In all cases, the geomembrane shall be dry and protected from wind damage.

3.4.4 General Seaming Procedures

Prior to seaming, the seam area shall be clean and free of moisture, dust, dirt, debris of any kind, and foreign material.

Seams shall be aligned with the fewest possible number of wrinkles and "fish mouths."

For seams which are to be extrusion welded, and as necessary for fusion welds, the seam overlap shall be ground in accordance with the Manufacturer's instructions, in a way that does not damage the geomembrane.

Welding speed and pressure, preheating temperature, nozzle (die) temperature, ambient air and sheet temperatures, and extrudate bead thickness shall be consistent with Manufacturer's recommendations or welding criteria established during start-up operations unless approved by the ENGINEER.

3.5 PROTECTION

The CONTRACTOR and INSTALLER shall take precautions as necessary to protect the geomembrane from damage due to exposure to the elements, or as part of deployment and seaming operations.

3.6 FIELD QUALITY CONTROL TRIAL SEAMS

Trial seams shall be performed in the presence of the QA Representative. Trial seams shall be made on scrap pieces of geomembrane under the same conditions that production seaming will be performed to verify that seaming conditions are satisfactory. Trial seams shall be made, at a minimum, at least once every four hours or as directed by the QA Representative for each seaming apparatus used that day. Each seamer shall make at least one trial seam each day.

The trial seam sample shall be at least three (3) feet long by one (1) foot wide (after seaming) with the seam centered lengthwise. Four adjoining specimens, each one (1) inch (25 mm) wide, shall be cut from the trial seam sample by the INSTALLER at locations selected randomly by the QA Representative. Two of the specimens shall be tested in peel and two tested in shear; none should fail in the seam.

3.7 FIELD NONDESTRUCTIVE SEAM TESTING

To check for seam continuity, the INSTALLER shall nondestructively test 100 percent of field seams over their entire length using a vacuum test unit, air pressure test, or other approved method. Air pressure testing is only applicable to those processes which produce a double seam with an enclosed space, and shall follow GRI GM6, Pressurized Air Channel Test for Dual Seamed Geomembranes.

3.7.1 Vacuum Testing Equipment

Test equipment, including but not limited to the following shall be furnished by the INSTALLER:

A. The vacuum box shall have a transparent viewing window on top and a soft, closed cell neoprene gasket attached to the bottom. The equipment shall be capable of inducing and holding a vacuum of 5 psig (10 in of Hg vacuum).

B. A steel vacuum tank and pump assembly equipped with a pressure controller and pipe connections; rubber pressure/vacuum hose with fittings; bucket and wide paint brush; soapy solution.

3.7.2 Vacuum Test Procedure

A. Energize the vacuum pump and adjust the tank vacuum to approximately 5 psig (10 in. of Hg vacuum) (35 kPa absolute); apply soapy solution to wet a strip of geomembrane; place the box over the wetted area; close the bleed valve and open the vacuum valve; ensure that a leak tight seal is created by the gasket; for a period of not less than 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles; and if no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inches (75 mm) overlap, and repeat the process.

B. All areas where soap bubbles appear indicate leaks or poor seam continuity and shall be marked, repaired and retested.

3.7.3 Air Pressure Test Equipment

A. An air pump (manual or motor driven) equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 psi (160 and 200 kPa); a rubber hose with fittings and connections; and a sharp hollow needle, or other approved pressure feed device.

3.7.4 Air Pressure Test Procedure

A. Testing length allowed up to the length of a roll.

B. Seal both ends of the seam to be tested ; insert needle or other approved pressure feed device into the channel created by the dual track fusion weld; and energize the air pump to a pressure between 25 and 30 psi (160 and 200 kPa), close valve, and sustain pressure for a minimum of 5 minutes;

C. If pressure drop exceeds 2 psi (15 kPa), or does not stabilize, locate faulty area, repair and retest; and

D. Remove needle or other approved pressure feed device and seal ends and needle puncture.

3.8 FIELD DESTRUCTIVE SEAM TESTING

3.8.1 Test Location

Destructive seam tests shall be performed at locations determined after seaming, at the QA Representative's discretion. The INSTALLER shall not be informed in advance of the locations where the seam samples will be taken.

3.8.2 Test Frequency

As a minimum, one test location shall be selected per 500 feet of seam length produced by each welding machine. (This minimum frequency is to be determined as an average taken throughout the entire facility.)

3.8.3 Procedure

A 42 inch (106 cm) long sample is taken by the INSTALLER from the seam and cut into three individual 14 inch (36 cm) samples. Individual samples go to the CQC organization, the CQA organization and the OWNER. The CQC organization shall cut their samples into 5 shear and 5 peel (alternating adjacent) test specimens and conduct the tests immediately in accordance with ASTM D 6392 or equivalent testing method. The remaining sample is archived by the OWNER.

3.8.4 Geosynthetic Laboratory Testing

If destructive seam testing is to be performed off-site, packaging and shipping of destructive test samples shall be conducted in a manner which will not damage the test sample. The QA Representative shall verify that packaging and shipping conditions are acceptable. This procedure shall be fully outlined prior to construction.

Testing shall include "Shear Testing" and "Peel Testing" (ASTM D6392). The minimum acceptable values to be obtained in these tests are those indicated in Table 3, HDPE Geomembrane Seam Properties. At least 5 specimens shall be tested for each test method. At least 4 of the 5 specimens tested shall meet or exceed the requirements indicated in Table 3.

The CONTRACTOR's laboratory test results shall be presented in writing to the QA Representative, ENGINEER and the OWNER as required by ASTM D 6392.

3.8.5 Procedures for Destructive Test Failures

All acceptable seams must be bounded by two locations from which samples passing laboratory destructive tests have been taken.

The following procedures shall apply whenever a sample fails a destructive test, whether that test is conducted by the QA Representative, the INSTALLER, the CONTRACTORS independent QC laboratory, or by field tensiometer. The INSTALLER has two options:

A. The INSTALLER can reconstruct the seam between any two passing test locations;

B. The INSTALLER can trace the welding path to an intermediate location (10 feet minimum from the point of the failed test in each direction) and take a single specimen for an additional field test at each location. If these additional specimens pass the test, then full samples are taken. If these samples pass the tests, then the seam is reconstructed between these locations. If either sample fails, then the process is repeated to establish the zone in which the seam should be reconstructed.

The installer shall notify the QA Representative before beginning either option. The QA Representative shall be present during this entire process to document all actions taken in conjunction with destructive test failures.

3.9 DEFECTS AND REPAIRS

3.9.1 Identification

The entire geomembrane, including seams, shall be visually examined by the QA Representative for identification of visual defects. All areas showing defects and/or requiring repairs shall be repaired at no additional cost to the OWNER.

Work shall not proceed with any materials which will cover locations which have been repaired until the QA Representative has re-examined the repaired area and applicable laboratory test results with passing values are available.

Panels or portions of panels which, in the opinion of the QA Representative, are damaged beyond repair shall be removed from the site and replaced. Damage which, in the QA Representative's opinion, can be repaired may be repaired or replaced.

3.9.2 Repair Procedures

Any portion of the geomembrane exhibiting a flaw or failing a destructive or nondestructive test shall be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure shall be agreed upon between the QA Representative, INSTALLER, and ENGINEER. The procedures available include patching, grinding and rewelding, spot welding, capping, and removing a bad seam and replacing with a strip of new material welded into place.

3.9.3 Verification of Repairs

Each repair shall be nondestructively tested. Repairs which pass the non-destructive test shall be taken as an indication of an adequate repair. At the discretion of the QA Representative, large repairs may require destructive test sampling.

3.9.4 Wrinkles

When seaming of the geomembrane is completed (or when seaming of a large area of the geomembrane is completed) and prior to placing overlying materials, the QA Representative shall indicate which wrinkles shall be cut and reseamed by the INSTALLER.

3.9.5 Bridging

The HDPE geomembrane shall be continuously supported on the accepted subgrade. Bridging (unsupported geomembrane) is not permissible. INSTALLER shall take necessary steps to prevent bridging and repair or replace any geomembrane so affected.

3.10 PLACEMENT OF PROTECTIVE COVER/DRAINAGE LAYER MATERIALS

A. The geomembrane shall not be left exposed (uncovered) to the elements for any period greater than thirty (30) days.

B. All protective cover/drainage layer materials placed over geosynthetics (geomembrane and geocomposite drainage net) shall be installed without damaging the geosynthetics. Equipment used for placing soil shall not be driven directly on the geomembrane unless authorized in writing by ENGINEER. A minimum thickness of one (1) foot (0.3 m) of soil or drainage layer is required between a low ground pressure dozer and the geomembrane. Placement of material overlying the geosynthetics shall be in conformance with the following guidelines for equipment ground pressure:

EQUIPMENT GROUND PRESSURE		MINIMUM SOIL THICKNESS	
kPa	(psi)	meters	(in.)
<35	(<5)	0.30	(12)
35-45	(5-6)	0.38	(15)
45-60	(6-8)	0.45	(18)
60-85	(8-11)	0.60	(24)

C. In heavily trafficked areas such as access ramps, protective cover thickness shall be at least three (3) feet (0.9 m) during construction.

D. Placement of materials shall generally begin at the toe and proceed up the slopes.

E. Material shall not be dropped from a height greater than 3 feet to place the first lift over the geosynthetics.

F. Material shall be placed such that the underlying geosynthetics are not shifted, damaged, or tensioned. Any geomembrane which is damaged during placement shall be repaired or replaced.

G. With ENGINEER's approval, CONTRACTOR may construct a test pad to demonstrate that construction equipment placing or driving across the protective cover/drainage layers does not damage the liner. The CONTRACTOR shall bear all costs associated with the inspections and damage repairs due to sharp turning or braking of the equipment driving across the protective/drainage layers.

3.11 DOCUMENTATION OF CONSTRUCTION

Upon project completion, the CONTRACTOR and INSTALLER will provide documentation of test results, record drawings, and inspection results as described below:

A. Test and inspection results:

1. Results of prequalification testing (including extrudate);
2. The results of all destructive and non-destructive seam tests;
3. Subgrade acceptance forms.

B. Geomembrane record drawings.

C. QA and QC records regarding panel deployment, seaming, and repairs.

3.12 TABLES

NOTE TO TABLES: ENGINEER shall approve test procedures, or modified procedures, as test methods are changed or updated frequently.

TABLE 1-02922
HDPE RESIN PROPERTIES
(WITHOUT CARBON BLACK)

Property	Qualified	Unit	Test Method	Specified Value
Polymer Specific Gravity	minimum	g/cc	ASTM D 792 Method A or ASTM D1505	≥0.93
Polymer Melt Index	range	g/10 min	ASTM D 1238 (Condition E 190/216)	<1.0

TABLE 2-02922
TEXTURED HDPE GEOMEMBRANE PROPERTIES

Property	Qualified	Unit	Test Method	Specified Value
Thickness	min. avg. (nom.) Lowest min. for 8 out of 10	mils mils	ASTM D 5994	57 54
Surface Type				Textured (both sides)
Density	min. avg.	g/cc	ASTM D 792 or ASTM D 1505	0.940
Tensile Properties (each direction) 1. Yield Strength 2. Break Strength 3. Yield Elongation 4. Break Elongation	 min. avg. min. avg. min. avg. min. avg.	 lb/in lb/in percent percent	 ASTM D 6693 Type IV ASTM D 6693 Type IV ASTM D 6693 Type IV ASTM D 6693 Type IV	 126 90 12 100
Tear resistance	min. avg.	lbs	ASTM D 1004	42
Stress Crack Resistance(1)	Minimum	hours	ASTM D 5397	300
Oxidation Induction Time Standard OIT, or High Pressure OIT	min. avg.	Minutes minutes	ASTM D 3895 ASTM D 5885	100 400
Oven Aging at 85ºC Standard OIT, or High Pressure OIT	min. avg.	% retained after 90 days	ASTM D 3895 ASTM D 5885	55 80
UV Resistance(2) High Pressure OIT	min. avg.	% retained after 1600 hours	ASTM D 5885	50
Asperity Height (3)	min. avg.	mils	GRI GM 12 or ASTM D 7466	10
Puncture Resistance	min. avg.	lbs	ASTM D 4833	90
Carbon Black Content	Range	percent	ASTM D 1603	2.0-3.0
Carbon Black Dispersion	Rating	N/A	ASTM D 5596	9 in Categories 1 or 2, and 1 in Category 3 per GRI GM 13
Coefficient of Interface Friction	Minimum	degrees	ASTM D 5321 (4)	24

NOTES:

(1) P-NCTL test is not appropriate for testing geomembranes with textured or irregular surfaces. Test should 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. The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

(2) The condition of the test should be 20 hr. UV cycle at 75ºC followed by 4 hr. condensation at 60ºC. UV resistance is based on percent retained value regardless of the original HP-OIT value.

(3) Of 10 readings; 8 out of 10 must be ≥ 7 mils, and the lowest individual reading must be ≥ 5 mils. Alternate the measurement side for double-sided textured sheet.
(4) Interface friction angle tests with Compacted Clay Liner and with GDN (ASTM D5321) at normal stresses of 2,500 psf, 5,000 psf, 10,000 psf, and 12000 psf. Adhesion may be considered in calculating effective interface friction angle. Compact CCL to maximum dry density in accordance with Section 02443. Conduct for minimum displacement 3 inches at a displacement rate of 0.04 inches per minute. Record asperity height and peak shear strength values. Each interface shall be tested separately.

TABLE 3 - 02922
TEXTURED HDPE GEOMEMBRANE SEAM PROPERTIES

Property	Qualified	Unit	Test Method	Specified Value
Seam Shear Strength (Fusion and Extrusion)	min.	lb/in	ASTM D 6392	120
Shear Elongation (Fusion and Extrusion)	min.	percent	ASTM D 6392	50
Peel Adhesion:				
Fusion	min.	lb/in	ASTM D 6392	91
Extrusion	min.	lb/in	ASTM D 6392	78

NOTES:
(1) The geomembrane shall yield before failure of the seam for shear tests. Seam separation shall not extend more than 25 percent into the seam for peel adhesion tests. Testing shall be discontinued when the sample has visually yielded. At least 4 of 5 specimens tested in sheer and in peel shall exhibit a film tear bond (FTB) failure not in the seam area.
(2) Shear elongation test should be omitted for field testing.
(3) Seam shear and peel strengths listed are for 4 out of 5 samples; the 5th specimen can be as low as 80% of the listed values.

3.13 CERTIFICATE

CERTIFICATE OF ACCEPTANCE
OF SOIL SUBBASE BY INSTALLER

INSTRUCTIONS: This part of the certificate should be completed by the CONTRACTOR.

CONTRACTOR:

NAME_____

ADDRESS_____

_____

_____

PROJECT:

LOCATION_____

PROJECT_____

LOCATION OF SOIL SUBBASE SURFACE TO BE UTILIZED (INCLUDE SKETCH, IF NEEDED):

_____

_____

_____

CONTRACTOR AUTHORIZED REPRESENTATIVE:

NAME_____

TITLE_____

SIGNATURE/DATE_____

INSTRUCTIONS: This part of the certificate should be completed by the HDPE Geomembrane INSTALLER.

I THE UNDERSIGNED, DULY AUTHORIZED REPRESENTATIVE OF:

_____

(HDPE GEOMEMBRANE INSTALLATION COMPANY)

DO HEREBY ACCEPT THE SOIL SUBBASE (SOIL SUPPORTING THE GEOMEMBRANE) OR GCL AND SHALL BE RESPONSIBLE FOR ITS INTEGRITY AND SUITABILITY, IN ACCORDANCE WITH THE SPECIFICATIONS FROM THIS DATE TO COMPLETION OF THE INSTALLATION.

_____

INSTALLER AUTHORIZED REPRESENTATIVE:

NAME_____

TITLE_____

SIGNATURE/DATE_____

END OF SECTION

SECTION 02931

GEOCOMPOSITE DRAINAGE NET (GDN) FOR LEACHATE COLLECTION

PART 1 - GENERAL

1.1 SUMMARY

The work covered in this Section includes the manufacture, fabrication, testing, supply and installation of the Geocomposite Drainage Net (GDN), also referred to as the composite drainage net or geocomposite. Geonet or drainage net refers to the HDPE core between the geotextiles. The CONTRACTOR shall furnish all labor, materials, transportation, handling, storage, supervision, tools, incidentals and other equipment that may be necessary to install and test the GDN as specified by the Contract Documents. All testing specified in this section is Construction Quality Control (CQC) testing and is the CONTRACTOR's responsibility.

1.2 REFERENCES

Unless otherwise noted, ASTM International standard test methods or practices are to be referenced for test methods and practices. The ENGINEER shall approve other test procedures, or modified procedures, as test methods are changed or updated frequently.

1.3 SUBMITTALS

A. Product Information

The CONTRACTOR or GDN INSTALLER shall submit the following product information to the ENGINEER for approval at least 30 days (unless otherwise specified) prior to procurement of the product:

1. Prequalification: Independent laboratory test results demonstrating compliance with the material properties listed in Table 1-02931, Drainage Net Properties; Table 2-02931, Geotextile Properties; and Table 3-02931, Geocomposite Properties. The independent laboratory tests are to be performed once for each material. In addition, the manufacturer must provide a certificate of compliance which states that the material to be installed will use the same manufacturing techniques, resin type, and formulation as that for which test results are submitted.

2. Roll Layout Drawings: At a minimum, include a roll layout drawing and installation details. The roll layout drawing shall be drawn to scale, and shall be coordinated with the geomembrane panel layout. Installation details shall include cross sections of toe drains, temporary anchorage, anchor trench and other terminations, and pipe penetrations.

3. Protection from Wind and Weather: Submit plans to protect the GDN from wind, dirt, and direct sunlight.

4. Material Data: Complete manufacturer's specifications, descriptive drawings, and literature for the GDN, including the product identification and suppliers of the polymer resin and recommended methods for handling and storage of all materials prior to installation. Describe the manufacturer's methodology to comply with the requirements specified for manufacturing quality control.

5. Manufacturing Quality Control (MQC): Complete description of the manufacturer's formal quality control/quality assurance programs for manufacturing, fabricating, handling, installing, and testing. The description shall include, but not be limited to, polymer resin supplier and product identification, acceptance testing, production testing, installation inspection, installation techniques, repairs, and acceptance. The document shall include a complete description of methods for both roll end and roll side joining.

6. Installation Instructions: Samples of the GDN with a complete set of specifications, and manufacturer's complete written instructions for storage, handling, installation, and joining.

7. Qualifications: Manufacturer's qualifications for the GDN.

8. Resin: The name of the resin supplier, the production plant, the brand name, and name of resin used to manufacture the product.

9. Suppliers and/or manufacturers shall certify that geonet and geotextile are compatible with one another when bonded into the GDN.

B. Manufacturing Quality Control

The CONTRACTOR shall submit quality control test reports within 48 hours of completion of tests. Submit the following manufacturing quality control information to the ENGINEER prior to material shipment:

1. Production Dates: Submit statement of production dates for the GDN.

2. Test Reports: See Part 2 for tests and test frequencies.

C. Proof of INSTALLER’S Qualifications:

1. The name or names of the field superintendents who will be proposed for the project and a list of completed facilities for which the field superintendent(s) has (have) installed GDN totaling a minimum of 2,000,000 ft^2.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S QUALIFICATIONS

Manufacturer shall have manufactured a minimum of 5,000,000 ft^2 of GDN.

A. Single Source

All drainage net used for construction of the GDN must be obtained from a single material supplier or manufacturer. All non-woven geotextile fused to the geonet and used for the construction must be obtained from a single material supplier. All fusion of drainage net to non-woven geotextile must be accomplished by a single material supplier or manufacturer.

2.2 DRAINAGE NET

The drainage net (geonet) component of the GDN shall be manufactured to form a three dimensional structure to provide planar water flow.

A. Material Properties

Drainage net shall meet the requirements of Table 1-02931, Drainage Net Properties.

B. Material Composition

The drainage net shall consist of new, first-quality products designed and manufactured specifically for the intended purpose designated in this contract, as satisfactorily demonstrated by prior use. The drainage net shall contain stabilizers to prevent ultraviolet light degradation. The material shall be unmodified HDPE containing no plasticizer, fillers, chemical additives, reclaimed polymers, or extenders, or equivalent material as approved by the ENGINEER. Carbon black shall be added to the resin for ultraviolet resistance. The only other allowable compound elements shall be anti-oxidants and heat stabilizers, of which up to one (1) percent total, as required for manufacturing, may be added.

2.3 GEOTEXTILE

The geotextile component of the GDN shall meet the requirements of Table 2-02931, Geotextile Properties.

2.4 GEOCOMPOSITE DRAINAGE NET

The GDN shall meet the requirements of Table 3-02931. It is comprised of three layers: a lower geotextile, a middle drainage net, and an upper geotextile.

A. Manufacture

The GDN shall be fabricated by heat bonding the geotextile to both sides of the drainage net. No burn through of geotextiles will be permitted. No glue or adhesive shall be permitted. The bond between the geotextile and the drainage net shall meet the requirements of Table 3-02931.

B. Labels

The GDN shall be supplied in rolls, marked or tagged with the following information:

1. Manufacturer's name
2. Product identification
3. Lot number
4. Roll number
5. Roll dimensions

C. Roll Dimensions

The GDN shall be supplied as a continuous sheet with no factory seams. During installation, the roll length shall be maximized to provide the largest manageable roll for the fewest field seams. Rolls shall be wound on a core, which shall be stable enough to support the rolls during handling and shipping.

D. Coefficient of Interface Friction

The GDN shall have a soil/geosynthetic and geosynthetic/geosynthetic interface friction angle meeting the requirements of Table 3-02931. Adhesion may be considered in determining the effective interface friction angle.

2.5 MANUFACTURING QUALITY CONTROL TESTING

All of the specified tests are the CONTRACTOR's responsibility. Testing during manufacturing shall be accomplished by the manufacturer's laboratory.

A. Resin shall be tested at a frequency of one test per resin batch. One batch is defined as one rail car load of resin. The finished rolls of the drainage net shall be identified by a roll number corresponding to the resin batch used. The following minimum test frequencies shall be observed:

Property	Test Method	Minimum Frequency
Polymer Density	ASTM D 1505	1 per batch
Polymer Melt Index	ASTM D 1238	1 per batch

B. The drainage net shall be tested during manufacturing for compliance with Table 1-02931, Drainage Net Properties. The following minimum test frequencies shall be observed:

Property	Test Method	Minimum Frequency
Polymer Density (with Carbon Black)	ASTM D 1505	1/50,000 sf
Thickness	ASTM D 5199	1/50,000 sf
Carbon Black Content	ASTM D 1603	1/50,000 sf
Tensile Strength, MD	ASTM D 7179	1/50,000 sf

C. Geotextile shall be tested during manufacturing for the compliance with Table 2-02931, Geotextile Properties. The following minimum test frequencies shall be observed:

Property	Test Method	Minimum Frequency
Mass (Wt.) per Unit Area	ASTM D 5261	1/90,000 sf
Grab Strength	ASTM D 4632	1/90,000 sf
CBR Puncture	ASTM D 6241	1/540,000 sf
Permittivity	ASTM D 4491	1/540,000 sf
AOS	ASTM D 4751	1/540,000 sf

D. GDN shall be tested during manufacturing for compliance with Table 3-02931, Geocomposite Properties. The following minimum test frequencies shall be observed:

Property	Test Method	Minimum Frequency
Ply Adhesion (minimum)	ASTM D 7005	1/50,000 sf
Transmissivity	ASTM D 4716	1/100,000 sf (min. 2/project)
Interfacial Friction of Geocomposite	ASTM D 5321	1/project

The CONTRACTOR shall inspect every roll for bonding integrity between the drainage net and the geotextile. All poorly bonded and/or delaminated material shall be rejected.

PART 3 - INSTALLATION

3.1 FIELD QUALITY CONTROL

Field Joining: The CONTRACTOR shall inspect all roll end joints and roll edges. The results of these inspections shall be documented in the daily reports. Field joints shall comply with the requirements of Table 4-02931, Geocomposite Drainage Net Joining Methods.

A. Quality Control Reporting Procedures

All information regarding the installation of the GDN shall be recorded in the CONTRACTOR's daily report. This information shall include:

1. Reference to product submittals, certifications, substitutions and approvals;

2. Dates of installation;

3. Location and quantity of materials installed (as-built drawing);

4. Statement whether materials were installed in accordance with the Technical Specifications; and

5. Additional information as required.

6. All product certifications, filed appropriately for future reference.

3.2 MANUFACTURER'S RECOMMENDATIONS

The geocomposite drainage net shall be installed in accordance with the contract documents and the manufacturer's recommendations. In case of a conflict between requirements, the more stringent shall apply.

3.3 CLEANLINESS

A. Both the GDN and underlying geomembrane shall be clean, dry, and free of dirt and dust during installation. If dirt, dust, or water is present, the CONTRACTOR shall clean the work area. GDN which is wet, dirty or muddy shall be discarded and shall not be installed.

B. For GDN installed on soil, the bedding soil shall be free of standing water, debris, and rocks greater than ½ inch.

3.4 ROLL JOINING METHODS

Table 4-02903, Geocomposite Drainage Net Joining Methods, summarizes acceptable roll joining methods.

A. Lap Seams

The bottom layer of geotextile shall be lap seamed. Lap seaming is accomplished by overlapping adjacent geotextile.

B. Nylon Ties

The geonet shall be overlapped and fastened with nylon ties. Nylon ties shall be yellow or white in color to facilitate inspection.

C. Machine Sewn Seams

Sewing shall be accomplished with a chain-stitching sewing machine. The thread shall be polymeric thread which complies with geotextile manufacturer's recommendations and is a color which contrasts with the color of the geotextile. The seam shall be placed a minimum of 2 inches from the geotextile edges.

3.5 ROLL JOINING REQUIREMENTS

The minimum requirements for joining rolls are specified in Table 4-02931, Geocomposite Drainage Net Joining Methods.

A. Roll Ends

Roll ends shall be shingled; the uphill roll end shall be overlapped over the downhill roll end. The upper layer of geotextile shall be machine sewn or continuously leistered.

B. Adjacent Roll Sides

At roll sides the material shall be overlapped. The bottom geotextile shall be lap seamed. The GDN shall be overlapped and tied. The upper layer of geotextile shall be machine sewn.

3.6 INSTALLATION

The GDN shall be installed in accordance with the manufacturer's recommendations and as specified herein. In case of a conflict between requirements, the more stringent shall apply.

A. Orientation

The GDN shall be rolled down the slope in such a manner as to continually keep the material in tension. If necessary, the material shall be positioned by hand after unrolling to minimize wrinkles. The material shall not be unrolled horizontally (i.e., across the slope).

B. Wind

The CONTRACTOR shall provide sufficient ballast and temporary anchorage to protect the material from wind damage or displacement. The CONTRACTOR is responsible for protecting the material from damage due to weather at all times.

C. Physical Damage

1. Personnel walking on the material shall not engage in activities or wear footwear that could damage the material. Smoking shall not be permitted on or near the geosynthetics.

2. Vehicular traffic shall not be permitted on the geosynthetics. Equipment shall not damage the material by handling, trafficking, or leakage of hydrocarbons. The surface shall not be used as a work area for storing tools and supplies, or other uses.

D. Bridging: The material shall be installed to avoid bridging.

E. Corners

In corners, where overlaps between rolls are staggered, an extra roll shall be installed from the top to the bottom of the slope to provide a smooth, protected surface.

F. Weather Protection

The GDN shall be protected from direct sunlight or precipitation prior to installation. After installation this material shall have minimal exposure to direct sunlight and shall be completely protected from direct sunlight within 30 days of installation. Material which is exposed to direct sunlight for 30 days or more shall be replaced at the CONTRACTOR's expense.

It is the CONTRACTOR's responsibility to provide all labor and materials for protection of the GDN during the period of time prior to installation of overlying materials. The CONTRACTOR's protection method is subject to the approval of the ENGINEER.

G. Placement of Overlying Materials

Refer to Section 02922, Textured HDPE Geomembrane, Paragraph 3.10 for requirements on placement of materials overlying the geosynthetics, including the GDN.

3.7 REPAIRS

A. Limitations

Damaged, soiled, or delaminated GDN shall be removed and discarded.

B. Minor Damage

Minor damage is defined as a defect or hole in the material that is smaller than 2 inches in its lesser dimension. Minor damage may be repaired by snipping out any protruding drainage net and machine sewing or leistering a geotextile patch over the hole. The patch shall be a large enough to meet the required overlaps noted in Table 4-02931, below.

C. Major Damage

Major damage is defined as a defect or hole in the material that is 2 inches or larger in its lesser dimension. Necessary repair shall be approved by the ENGINEER. The ENGINEER may request that the entire panel be replaced.

3.8 TABLES

TABLE 1-02931. DRAINAGE NET PROPERTIES

Property	Qualifier	Unit	Min. Ave. Value
Polymer Density, Resin plus Carbon Black (ASTM D1505)	MAV	g/cm^3	0.940
Tensile Strength (MD) (ASTM D7179)	MAV	lb/in	100
Carbon Black (ASTM D4218)	Range	Percent	2.0 - 3.0
Thickness (ASTM D5199)	MAV	mil	300

TABLE 2-02931. GEOTEXTILE PROPERTIES

Property	Qualifier	Unit	Min. Ave. Roll Values
Fabric Weight (ASTM D5261)	MARV	oz/yd^2	8.0
Grab Strength (ASTM D4632)	MARV	lbs	220
CBR Puncture (ASTM D6241)	MARV	lbs	575
Permittivity (ASTM D4491)	MARV	1/sec	1.3
AOS (ASTM D4751)	Maximum	US sieve size	80

TABLE 3-02931. GEOCOMPOSITE PROPERTIES

Property	Qualifier	Unit	Min. Ave Value
Ply Adhesion (ASTM D7005)	Minimum Average	lb/in	1.0
Transmissivity* (ASTM D4716)	Minimum	m^2/sec	1.5×10^{-3}
Interfacial Friction Tests** (ASTM D5321)			
Protective Layer	Minimum	degrees	26
Geomembrane	Minimum	degrees	24

* Test with a normal stress of 10,000 psf; water at 20° (68°F); with a gradient of 0.1; a profile of upper load plate, protective layer material, GDN, geomembrane, and lower load plate; and a time period of 100 hours.

** Soil at optimum moisture and compaction per Section 02225, 02233, 02443, or 02444 as applicable. Test GDN with protective layer material and with geomembrane. Normal stress of 2,500 psf, 5,000 psf, 10,000 psf, and 12,000 psf along with a displacement rate of 0.04 inches/minute shall be used. Adhesion may be considered in calculating effective interface friction angle.

TABLE 4-02931. GEOCOMPOSITE DRAINAGE NET JOINING METHODS

Location	Layer	Joining Method	Min. Overlap	Tying Frequency
	Upper geotextile	machine sewing or continuously leistered	6"	N/A
Roll End	Geonet	nylon ties	6"	2' on center
	Lower geotextile	overlap	6"	N/A
	Upper geotextile	machine sewing	4"	N/A
	Geonet	nylon ties	4"	5' on center
Roll Side	Lower geotextile	overlap	4"	N/A
Repair of minor damage*	Upper geotextile	machine sewing or continuously leistered	4"	N/A
	Geonet	Nylon ties	4”	6"

* Minor damage is defined in Part 3.7.

END OF SECTION

SECTION 02932

RAIN COVER

PART 1 – GENERAL

Provide flexible membrane liner material for use as a cover to shed rain water that falls within the new solid waste disposal cell.

1.1 SUBMITTALS

Submit the following information to the ENGINEER:

A. Manufacturer's specifications, literature, installation instructions, and handling and storage recommendations.

B. Certification of conformance from manufacturer stating that the material meets or exceeds the properties noted in Part 2.1 below, per GRI GM22.

C. Sample of the material.

PART 2 – PRODUCTS

2.1 RAIN COVER

A. The Rain Cover shall be a scrim reinforced polyethylene geomembrane capable of shedding rain water to a collection sump. The rain cover shall be resistant to ultraviolet rays, water infiltration, and puncture; have a minimum 5 years expected life in continuous use with constant exposure to the natural elements, and have a minimum nominal 12-mil thickness. The Rain Cover shall conform to the following properties:

Property	Test Method	Value*
Weight	ASTM D751	53 lb/1000 sf
Grab Tensile	ASTM D7004	76 lb
Grab Elongation	ASTM D7004	15%
Strip Tensile	ASTM D7003	51 lb
Strip Elongation	ASTM D7003	15%
Tongue Tear Test	ASTM D5884	40 lb
CBR Puncture	ASTM D6241	220 lb
UV Resistance (fluorescent light method)	ASTM D7238	-
- Strength and elongation after 10,000 light hours	ASTM D7004	50% retained
- Response to bending	GRI GM16	No cracking

*Minimum average roll values (MARV) unless otherwise noted.

B. Provide in panels 50,000 square feet or larger to minimize seaming.

C. Outer film layers shall contain carbon back to enhance outdoor life.

D. Raven Industries Inc. Dura-Skrim 12 BV meets the intent of these requirements.

2.2 BALLAST

A. Provide sandbags with a 40 pound capacity and constructed of material with a life expectancy equal to that of the rain cover. Fill sandbags with general fill or other soil materials.

PART 3 – EXECUTION

3.1 PANEL LAYOUT

A. Panels shall be oriented up and down slopes greater than 10-percent with no seams parallel to the slope within five feet of the top or toe of slope.

B. Seams shall not be placed in the sump area without approval of the ENGINEER.

3.2 DEPLOYMENT

A. Deploy panels in such a way to avoid damage including:

1. Do not deploy in windy conditions.

2. Do not drag over rough subgrades.

3. No vehicle traffic on the panels unless approved by the ENGINEER after a demonstration of vehicle procedures to be used.

B. For panel unfolding, provide a person every 20 feet minimum along panel edges.

C. Damaged panels shall be replaced or repaired at the ENGINEER’s direction.

3.3 FIELD SEAMS

A. Panels shall be welded in accordance with Manufacturer’s recommendations.

B. With approval of the ENGINEER, sewing of the panels is allowed. Sewing thread shall have a life expectancy equal to the rain cover and be acceptable to the rain cover Manufacturer.

C. Panel edges will be shingled with the upslope panel on top of the downslope panel. Overlap panels a minimum of four inches.

3.4 ANCHORING

A. Panels shall be anchored along the edge of the solid waste disposal cell as shown in the Drawings.

B. Provide ballast on rain cover at a spacing of 10 feet on center. On slopes greater than or equal to 4:1, ballast vertically along the slope shall be tied together from top to bottom (i.e., nearest ballast located on a slope flatter than 4:1) of the slope. The rope connecting the ballast will be anchored in the rain cover's anchor trench at the top of slope.

1. Ropes connecting ballast horizontally along the slope in not required.

3.5 REPAIRS

A. Flaws in the rain cover less than 1/8 inch in width may be repaired with extrusion welding a single bead in the area.

B. Other flaws shall be repaired with a patch extrusion welded to the rain cover. Patch material shall extend a minimum of 3-inches from the edge of the damaged area all-around.

END OF SECTION

SECTION 15060

LEACHATE COLLECTION SYSTEM PIPE AND FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The CONTRACTOR shall supply all materials, equipment and labor needed to install complete and ready for use pipe and fittings as specified herein and as indicated on the Drawings for the leachate collection system and other features.

B. Related Work Described Elsewhere

1. Section 02225 – Earthwork
2. Section 02233 – Aggregates

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced in the text:

a) ASTM International

b) American National Standard Institute (ANSI)

c) Plastics Piping Institute (PPI)

1.3 SUBMITTALS

A. Certificates of Compliance: on materials furnished.

B. Manufacturer's Brochures: Containing complete information and instruction pertaining to the storage, handling, installation, inspection, and repair of each type of pipe and pipe fitting furnished.

C. Shop Drawings

1. Show pipe dimensions, slopes, and invert elevations at connections. All tie-ins of new work to the existing systems shall be field-verified and shown on the Shop Drawings. The CONTRACTOR shall show coordination between proposed piping and all existing and proposed features.

2. Submit detailed Shop Drawings with marked up relevant descriptions of all valves including information and instructions relating to storage, handling, installation, operation and inspection of the valves.

1.4 DELIVERY STORAGE AND HANDLING

A. HDPE Pipe Storage

1. HDPE pipe shall be stored or stacked so as to prevent damage by marring, crushing, or piercing. Maximum stacking height shall be limited to 6 feet.

PART 2 – PRODUCTS

2.1 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

A. General

1. All HDPE pipe and fittings as indicated on the Drawings shall be a high-density polyethylene pipe using a 3408 type resin, or equivalent.

2. Pipe shall be extruded from a Type III, Class C, Category 5, Grade P34 compound. It shall be classified as cell 345444C or better. The manufacturer's literature shall be adhered to when "manufacturer's recommendations" are specified. All pipe and fittings shall be provided by one manufacturer.

2.2 VALVES

A. General

1. All valves shall be complete with all necessary operators, actuators, hand wheels, chain wheels, extension stems, floor stands, worm and gear operators, operating nuts, chains, wrenches, and other accessories or appurtenances which are required for the proper completion of the work. Operators, actuators, and other accessories shall be sized and furnished by the valve supplier and factory mounted.
2. Valves and operators shall be suitable for the exposure they are subject to, interior and exterior, as applicable. Valves shall have all safety features required by OSHA.
3. Unless otherwise shown, valves shall be the same size as the adjoining pipe.

B. Butterfly Valves

Unless otherwise noted, valves shall be butterfly bubble tight, wafer design, with a PVC body, nitrile seat, and compatible with a flat face flange, as manufactured by Asahi/America or equal.

C. Air Release and Vacuum Relief Valves

1. The air release and vacuum relief valves shall be combination air release valves, ported in size for the size of the line and length of the pipe they are protecting. Valve body shall be designed for a water working pressure of not less than 200 psi. Orifices shall be sized for the design pressure of the specific pipe length and size. They shall connect to a vertical tee with flanges or NSP threaded. The tee shall be connected to pipe runs by flanges.
2. Air release valves shall be supplied by the following:

   a. APCO
   b. Crispin
   c. EPG
   d. (or ENGINEER approved equal)

2.3 FLOWMETERS

A. Flowmeters shall be ultrasonic type, suitable for use in measuring leachate flows and capable of being programmed with the existing leachate control panel.

B. Flowmeters shall be made of 316 stainless steel.

C. Basis-of-Design Product: Subject to compliance with specifications, provide flow measurement equipment by one of the following:

1. Siemens/Danfoss MAG 3100 — 8800 W. Bradley Rd.
   And MAG 3100 EX — Milwaukee, WI 53324
2. ENGINEER Approved Equal

2.4 CAMLOCK CONNECTIONS

Coordinate camlock type connections with COUNTY to determine compatibility with their existing equipment. Provide male or female fittings as appropriate.

PART 3 - EXECUTION

3.1 HDPE PIPE JOINING

A. HDPE pipe shall not be bent more than the minimum radius recommended by the manufacturer for type, grade, and SDR. Care shall be taken to avoid imposing strains that will overstress or buckle the HDPE piping or impose excessive stress on the joints.

B. Joining HDPE Pipe

1. Only two methods shall be utilized to joining HDPE pipe: Heat fusion and mechanical joining.

C. Mechanical Joining

1. Shall be accomplished with HDPE flange adapters, neoprene gaskets, and ductile iron back-up flanges, and shall be used only where shown on the Drawings.

D. Heat Fusion

Heat fusion joints shall be made in accordance with manufacturer's recommendations and step by step procedures. Fusion equipment and a trained operator shall be provided by the CONTRACTOR. Pipe fusion equipment shall be of the size and nature to adequately weld all pipe sizes and fittings necessary to complete the project. Heat fusion shall be performed outside of trenches whenever practical. Before heat fusing pipe, each length shall be inspected for the presence of dirt, sand, mud, shavings, and other debris. Any foreign material shall be completely removed. At the end of each day, all open ends of fused pipe shall be capped or otherwise covered to prevent entry by animals or debris.

3.2 HDPE PIPE INSTALLATION

A. Pipe installation shall comply with the manufacturer's recommendations.

B. Lengths of fused pipe to be handled as one section shall not exceed 400-feet.

C. Installing Perforated HDPE Leachate Collection Pipe

After the completion of the Textured HDPE Geomembrane Liner and geocomposite drainage net, the placement of the leachate collection system shall be performed. The leachate collection system shall be installed as shown on the Drawings. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. HDPE pipe shall be protected from exposure to the direct sunlight prior to laying as needed to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Diversion of drainage during construction shall be provided as necessary. All pipe in place shall be inspected before placing the Leachate Collection Layer over the pipe, and those pipes damaged during placement shall be removed and replaced at no additional expense to the OWNER.

D. The ENGINEER or the CQA Representative shall be notified prior to any pipe being installed in order for him/her to have an opportunity to inspect the following items:

1. All butt and saddle fusions
2. Pipe integrity.
3. Trench excavation for rocks and foreign material.
4. Trench contours to ensure the pipe will have uniform and continuous support.

E. Any irregularities found during this inspection must be corrected before lowering the pipe into the trench. Pipe shall be allowed sufficient time to adjust to trench temperature prior to any testing, segment tie-ins, and/or backfilling.

F. Movement of Construction Machinery

In compacting by rolling or operating heavy equipment parallel with HDPE pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over installed pipe at any stage of construction shall be at the CONTRACTOR'S risk. Any damaged pipe shall be repaired or replaced at no additional expense to the OWNER.

G. Protection of Geosynthetics

Geomembrane and geocomposite drainage net underlying the piping shall be protected in accordance with Section 02922, Textured HDPE Geomembrane Paragraph 3.10.

3.3 LEACHATE FORCE MAIN INSTALLATION

A. The leachate force main shall be installed as shown on the Drawings. No sections of pipe shall be laid on a flat pipe grade unless approved by the ENGINEER.

3.4 VALVE INSTALLATION

B. Installation of the valves shall be to the configuration shown on the Drawings, shop drawings and in accordance with manufacturer's recommendations.

C. Test each valve upon completion of the installation. All valves shall operate without binding or straining. Any deficiencies shall be corrected.

3.5 FIELD QUALITY CONTROL TESTING

A. Safety

1. All testing of piping systems shall be done with due regard for the safety of employees and the public during the tests. Bulkheads, anchorage, and bracing suitably designed to resist test pressures shall be installed as

necessary and prudent. Compressed air shall not be used as a testing medium.

B. Hydrostatic Test

1. All non-perforated pipe shall be subjected to a hydrostatic test as described herein to detect any leaks in the piping. The CONTRACTOR shall notify the QA Representative prior to beginning testing.

2. Like sizes of polyethylene piping shall be butt welded together into testing segments not to exceed 1000 feet. Segments shall be connected to a testing apparatus on one end and fitted with temporary caps on all openings and at the point of transition between solid and perforated pipe.

3. The segment to be tested should be allowed time to reach constant and/or ambient temperature before initiating timing of the test. The test should be performed during a period when the pipe segment will be out of direct sunlight when possible, i.e., early morning, late evening, or cloudy days. This will minimize the pressure changes which will occur during temperature fluctuations.

4. Pipe shall be pressure tested at 50 psig. After all free air is removed from the test section, raise the pressure at a steady rate to the required pressure. The initial test pressure shall be applied and allowed to stand without makeup pressure for a sufficient time to allow for diametric expansion or pipe stretching to stabilize within 2-3 hours. After this stabilizing period, the test section can be returned to the test pressure, the pump turned off, and a final test pressure held for 3 hours.

5. If there are no visual leaks or significant pressure drops during the final test period, the pipeline passes the test. A significant pressure drop is defined as observable pressure drop, 0.1 psi or greater. Refer to ANSI B 31.8 Appendix N for a general recommended practice and procedure for hydrostatic testing. The ENGINEER shall be notified prior to commencement of the testing procedure and may be present during the test.

C. Equipment

1. Equipment for this testing procedure will be furnished by the CONTRACTOR. This shall consist of a polyethylene flange adaptor with a PVC blind flange. Tapped and threaded into the blind flange will be a temperature gauge 0- to 100-degrees C, a pressure gauge 40- to 60-psi (graduated in 0.1-psi increments), a "tire valve" to facilitate attachment of an air compressor hose, and a ball valve to release pipe pressure at completion of test. HDPE reducers shall be utilized to adapt test flange to size of pipe being tested.

1.2 TEST FAILURE

A. The following steps shall be performed when a pipe segment fails the test described above:

1. The pipe and all joints shall be inspected for cracks, pinholes, or perforations.

2. All blocked risers and capped ends shall be inspected for leaks.

3. Leaks shall be located and/or verified by applying a soapy water solution and observing soap bubble formation.

B. All pipe and joint leaks shall be repaired by cutting out the leaking area and rewelding the pipe. After all leaks are repaired, a retest shall be performed. This process shall be repeated until a successful test is achieved at no cost to the OWNER.

END OF SECTION